

# GLOBAL JOURNAL

OF MEDICAL RESEARCH: H

## Orthopedic & Musculoskeletal System

A Proximal Radius Case

Rheumatoid Arthritis in Uzbekistan

Highlights

Kapandji and Extra-Focal Fixation

Extra Articular Distal Radius Fractures

Discovering Thoughts, Inventing Future

VOLUME 21    ISSUE 2    VERSION 1.0

© 2001-2021 by Global Journal of Medical Research, USA



GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM

---

GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM

---

VOLUME 21 ISSUE 2 (VER. 1.0)

OPEN ASSOCIATION OF RESEARCH SOCIETY

© Global Journal of Medical Research. 2021.

All rights reserved.

This is a special issue published in version 1.0 of "Global Journal of Medical Research." By Global Journals Inc.

All articles are open access articles distributed under "Global Journal of Medical Research"

Reading License, which permits restricted use. Entire contents are copyright by of "Global Journal of Medical Research" unless otherwise noted on specific articles.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without written permission.

The opinions and statements made in this book are those of the authors concerned. Ultraculture has not verified and neither confirms nor denies any of the foregoing and no warranty or fitness is implied.

Engage with the contents herein at your own risk.

The use of this journal, and the terms and conditions for our providing information, is governed by our Disclaimer, Terms and Conditions and Privacy Policy given on our website <http://globaljournals.us/terms-and-condition/menu-id-1463/>

By referring / using / reading / any type of association / referencing this journal, this signifies and you acknowledge that you have read them and that you accept and will be bound by the terms thereof.

All information, journals, this journal, activities undertaken, materials, services and our website, terms and conditions, privacy policy, and this journal is subject to change anytime without any prior notice.

Incorporation No.: 0423089  
License No.: 42125/022010/1186  
Registration No.: 430374  
Import-Export Code: 1109007027  
Employer Identification Number (EIN):  
USA Tax ID: 98-0673427

## Global Journals Inc.

(A Delaware USA Incorporation with "Good Standing"; **Reg. Number: 0423089**)

Sponsors: *Open Association of Research Society*

*Open Scientific Standards*

### *Publisher's Headquarters office*

Global Journals® Headquarters  
945th Concord Streets,  
Framingham Massachusetts Pin: 01701,  
United States of America

USA Toll Free: +001-888-839-7392

USA Toll Free Fax: +001-888-839-7392

### *Offset Typesetting*

Global Journals Incorporated  
2nd, Lansdowne, Lansdowne Rd., Croydon-Surrey,  
Pin: CR9 2ER, United Kingdom

### *Packaging & Continental Dispatching*

Global Journals Pvt Ltd  
E-3130 Sudama Nagar, Near Gopur Square,  
Indore, M.P., Pin:452009, India

### *Find a correspondence nodal officer near you*

To find nodal officer of your country, please  
email us at [local@globaljournals.org](mailto:local@globaljournals.org)

### *eContacts*

Press Inquiries: [press@globaljournals.org](mailto:press@globaljournals.org)  
Investor Inquiries: [investors@globaljournals.org](mailto:investors@globaljournals.org)  
Technical Support: [technology@globaljournals.org](mailto:technology@globaljournals.org)  
Media & Releases: [media@globaljournals.org](mailto:media@globaljournals.org)

### *Pricing (Excluding Air Parcel Charges):*

Yearly Subscription (Personal & Institutional)  
250 USD (B/W) & 350 USD (Color)

# EDITORIAL BOARD

GLOBAL JOURNAL OF MEDICAL RESEARCH

## *Dr. Apostolos Ch. Zarros*

DM, Degree (Ptychio) holder in Medicine,  
National and Kapodistrian University of Athens  
MRes, Master of Research in Molecular Functions in  
Disease, University of Glasgow FRNS, Fellow, Royal  
Numismatic Society Member, European Society for  
Neurochemistry Member, Royal Institute of Philosophy  
Scotland, United Kingdom

## *Dr. William Chi-shing Cho*

Ph.D.,  
Department of Clinical Oncology  
Queen Elizabeth Hospital  
Hong Kong

## *Dr. Alfio Ferlito*

Professor Department of Surgical Sciences  
University of Udine School of Medicine, Italy

## *Dr. Michael Wink*

Ph.D., Technical University Braunschweig, Germany  
Head of Department Institute of Pharmacy and Molecular  
Biotechnology, Heidelberg University, Germany

## *Dr. Jixin Zhong*

Department of Medicine, Affiliated Hospital of  
Guangdong Medical College, Zhanjiang, China, Davis  
Heart and Lung Research Institute, The Ohio State  
University, Columbus, OH 43210, US

## *Dr. Pejic Ana*

Assistant Medical Faculty Department of Periodontology  
and Oral Medicine University of Nis, Serbia

## *Rama Rao Ganga*

MBBS  
MS (Universty of Health Sciences, Vijayawada, India)  
MRCS (Royal College of Surgeons of Edinburgh, UK)  
United States

## *Dr. Ivandro Soares Monteiro*

M.Sc., Ph.D. in Psychology Clinic, Professor University of  
Minho, Portugal

## *Dr. Izzet Yavuz*

MSc, Ph.D., D Ped Dent.  
Associate Professor, Pediatric Dentistry Faculty of  
Dentistry, University of Dicle Diyarbakir, Turkey

## *Dr. Sanjay Dixit, M.D.*

Director, EP Laboratories, Philadelphia VA Medical Center  
Cardiovascular Medicine - Cardiac Arrhythmia  
Univ of Penn School of Medicine  
Web: [pennmedicine.org/wagform/MainPage.aspx?](http://pennmedicine.org/wagform/MainPage.aspx?)

## *Sanguansak Rerksupphol*

Department of Pediatrics Faculty of Medicine  
Srinakharinwirot University  
NakornNayok, Thailand

## *Antonio Simone Laganà*

M.D. Unit of Gynecology and Obstetrics  
Department of Human Pathology in Adulthood and  
Childhood "G. Barresi" University of Messina, Italy



*Dr. Han-Xiang Deng*

MD., Ph.D  
Associate Professor and Research Department  
Division of Neuromuscular Medicine  
Davee Department of Neurology and Clinical  
Neurosciences  
Northwestern University Feinberg School of Medicine  
Web: [neurology.northwestern.edu/faculty/deng.html](http://neurology.northwestern.edu/faculty/deng.html)

*Dr. Roberto Sanchez*

Associate Professor  
Department of Structural and Chemical Biology  
Mount Sinai School of Medicine  
Ph.D., The Rockefeller University  
Web: [mountsinai.org/](http://mountsinai.org/)

*Dr. Feng Feng*

Boston University  
Microbiology  
72 East Concord Street R702  
Duke University  
United States of America

*Dr. Hrushikesh Aphale*

MDS- Orthodontics and Dentofacial Orthopedics.  
Fellow- World Federation of Orthodontist, USA.

*Gaurav Singhal*

Master of Tropical Veterinary Sciences, currently  
pursuing Ph.D in Medicine

*Dr. Pina C. Sanelli*

Associate Professor of Radiology  
Associate Professor of Public Health  
Weill Cornell Medical College  
Associate Attending Radiologist  
NewYork-Presbyterian Hospital  
MRI, MRA, CT, and CTA  
Neuroradiology and Diagnostic Radiology  
M.D., State University of New York at Buffalo,  
School of Medicine and Biomedical Sciences  
Web: [weillcornell.org/pinasanelli/](http://weillcornell.org/pinasanelli/)

*Dr. Michael R. Rudnick*

M.D., FACP  
Associate Professor of Medicine  
Chief, Renal Electrolyte and Hypertension Division (PMC)  
Penn Medicine, University of Pennsylvania  
Presbyterian Medical Center, Philadelphia  
Nephrology and Internal Medicine  
Certified by the American Board of Internal Medicine  
Web: [uphs.upenn.edu/](http://uphs.upenn.edu/)

*Dr. Seung-Yup Ku*

M.D., Ph.D., Seoul National University Medical College,  
Seoul, Korea Department of Obstetrics and Gynecology  
Seoul National University Hospital, Seoul, Korea

*Santhosh Kumar*

Reader, Department of Periodontology,  
Manipal University, Manipal

*Dr. Aarti Garg*

Bachelor of Dental Surgery (B.D.S.) M.D.S. in Pedodontics  
and Preventive Dentistr Pursuing Phd in Dentistry

<i>Sabreena Safuan</i>	<i>Arundhati Biswas</i>
Ph.D (Pathology) MSc (Molecular Pathology and Toxicology) BSc (Biomedicine)	MBBS, MS (General Surgery), FCPS, MCh, DNB (Neurosurgery)
<i>Getahun Asebe</i>	<i>Rui Pedro Pereira de Almeida</i>
Veterinary medicine, Infectious diseases, Veterinary Public health, Animal Science	Ph.D Student in Health Sciences program, MSc in Quality Management in Healthcare Facilities
<i>Dr. Suraj Agarwal</i>	<i>Dr. Sunanda Sharma</i>
Bachelor of dental Surgery Master of dental Surgery in Oromaxillofacial Radiology. Diploma in Forensic Science & Oodntology	B.V.Sc.& AH, M.V.Sc (Animal Reproduction, Obstetrics & gynaecology), Ph.D.(Animal Reproduction, Obstetrics & gynaecology)
<i>Osama Alali</i>	<i>Shahanawaz SD</i>
PhD in Orthodontics, Department of Orthodontics, School of Dentistry, University of Damascus. Damascus, Syria. 2013 Masters Degree in Orthodontics.	Master of Physiotherapy in Neurology PhD- Pursuing in Neuro Physiotherapy Master of Physiotherapy in Hospital Management
<i>Prabudh Goel</i>	<i>Dr. Shabana Naz Shah</i>
MCh (Pediatric Surgery, Gold Medalist), FISPU, FICS-IS	PhD. in Pharmaceutical Chemistry
<i>Raouf Hajji</i>	<i>Vaishnavi V.K Vedam</i>
MD, Specialty Assistant Professor in Internal Medicine	Master of dental surgery oral pathology
<i>Surekha Damineni</i>	<i>Tariq Aziz</i>
Ph.D with Post Doctoral in Cancer Genetics	PhD Biotechnology in Progress

## CONTENTS OF THE ISSUE

---

- i. Copyright Notice
- ii. Editorial Board Members
- iii. Chief Author and Dean
- iv. Contents of the Issue
1. A Comparative Study between Kapandji and Extra-Focal Fixation in Extra Articular Distal Radius Fractures. **1-7**
2. Acrometastasis: A Rare Entity. A Proximal Radius Case. **9-13**
3. Are Prophylactic Antibiotics Necessary in Primarily Closed Lacerated Wounds? **15-19**
4. Association of Rs763780 Polymorphism of Gene IL17F with the Risk of Developing Rheumatoid Arthritis in Uzbekistan. **21-24**
5. The Outcome of Surgical Management for Unstable Fracture of the Distal Radius by Volar Locking Plating System. **25-28**
6. Managing Orthopaedic Injuries in Covid-19 Pandemic: A Consise Review. **29-35**
- v. Fellows
- vi. Auxiliary Memberships
- vii. Preferred Author Guidelines
- viii. Index





GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM  
Volume 21 Issue 2 Version 1.0 Year 2021  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

# A Comparative Study between Kapandji and Extra-Focal Fixation in Extra Articular Distal Radius Fractures

By Dr. Kautilyakumar V. Mahida, Dr. Jyotish G. Patel & Dr. Ankit Patel

*GCS Medical College Hospital & Research Centre*

**Abstract- Purpose:** To assess and compare the radiological and functional outcome of extra articular distal radius fractures treated by either Kapandji technique or extra-focal technique of K wire fixation.

**Method:** From January 2018 to March 2020, 60 patients with extra articular distal radius fracture were included in this prospective study after obtaining informed consent regarding the same. Out of these 30 went under extra-focal technique and 30 went under Kapandji technique of K wire fixation. After surgery in both groups we immobilized the limb in below elbow cast for 5 weeks after which cast was removed and k-wires were removed. Radiographs were taken at 1 month, 3 months and 6 months post operatively. All patients followed proper physiotherapy protocol after 5 weeks of surgery.

**Keywords:** extra articular distal radius fracture, extra-focal technique, kapandji technique, K wire fixation, gartland and werley score.

**GJMR-H Classification:** NLMC Code: WE 175



*Strictly as per the compliance and regulations of:*



# A Comparative Study between Kapandji and Extra-Focal Fixation in Extra Articular Distal Radius Fractures

Dr. Kautilyakumar V. Mahida <sup>α</sup>, Dr. Jyotish G. Patel <sup>σ</sup> & Dr. Ankit Patel <sup>ρ</sup>

**Abstract- Purpose:** To assess and compare the radiological and functional outcome of extra articular distal radius fractures treated by either Kapandji technique or extra-focal technique of K wire fixation.

**Method:** From January 2018 to March 2020, 60 patients with extra articular distal radius fracture were included in this prospective study after obtaining informed consent regarding the same. Out of these 30 went under extra-focal technique and 30 went under Kapandji technique of K wire fixation. After surgery in both groups we immobilized the limb in below elbow cast for 5 weeks after which cast was removed and k-wires were removed. Radiographs were taken at 1 month, 3 months and 6 months post operatively. All patients followed proper physiotherapy protocol after 5 weeks of surgery. Radiological parameters including Ulnar variance, Palmer tilt, Radial length and Radial inclination were measured in both groups in every patient in fractured and non fractured side and statistical comparison were made between the groups 6 months postoperatively. Functional outcomes were also assessed using Gartland and Werley score in both groups 6 months postoperatively.

**Result:** 6 months postoperatively Gartland and Werley score showed 43.33% excellent and 56.67% good results in kapandji technique; while it showed 40% excellent and 60% good result in extra-focal technique. Radiological parameters showed a comparable outcome in ulnar variance, radial length and radial inclination in both groups; while a statistically significant difference was seen in palmar tilt outcome of the two groups with Kapandji technique showing less loss of palmar tilt.

**Conclusion:** We conclude that both Kapandji and Extra-focal K wire fixation of Extra articular Distal Radius fracture provided excellent to good functional outcome as well as an acceptable radiological outcome at 6 months postoperative followup; given that appropriate immobilization followed by proper physiotherapy is followed by the patient.

**Keywords:** extra articular distal radius fracture, extra-focal technique, kapandji technique, K wire fixation, gartland and werley score.

**Author α:** Senior Resident, Orthopaedics department, GCS Medical College Hospital & Research Centre, Ahmedabad.  
e-mail: kautilya18496@gmail.com

**Author σ:** Head of the Department, Orthopaedics Department, GCS Medical College Hospital & Research Centre, Ahmedabad.  
e-mail: Drjgpatel@gmail.com

**Author ρ:** Assistant Professor, Orthopaedics department, GCS Medical College Hospital & Research Centre, Ahmedabad.  
e-mail: drankit\_3103@yahoo.com

## I. INTRODUCTION

Distal radius fracture is the most common fracture of the upper extremity<sup>(1)</sup>, accounting for 17.5% of all adult fractures. These are one of the most common skeletal injuries treated by orthopaedic surgeons and remains a topic of discussion till date, since Abraham Colles described this entity clinically in 1814.

Distal radius is important in kinematics of radiocarpal and radioulnar joints, proper reduction of articular surface, restoration of radial height, palmar tilt, radial inclination are prerequisites for good clinical outcome. Failure to achieve and maintain reduction leads to visible deformity, degenerative arthritis, distal radioulnar and radiocarpal instability and ulnar impaction syndrome with resultant pain, decrease in mobility, decrease grip strength and function. Distal radius is foundation of wrist joint and indispensable part of ligamentous support. So reconstruction of articular congruity and stable fixation reduce the incidence of post traumatic osteoarthritis and allows early functional rehabilitation.

Many treatment options for Distal radius fractures have been described, such as conservative treatment described by Colles<sup>(2)</sup>, close reduction and cast immobilization<sup>(3)</sup>, external fixation<sup>(4)</sup>, close reduction and percutaneous fixation with Kirschner wires<sup>(5)</sup> and open reduction and internal fixation<sup>(6)</sup>.

There have been many studies regarding extra articular distal fracture treatment to find the better management option. Advantages of some methods over the other have become known; for example use of some kind of fixation like percutaneous fixation with Kirschner wires reduces the chances of the fracture from further displacement till the time of bone healing, which is a concern in close reduction and cast immobilization<sup>(7)</sup>, but the gold standard method of treatment still is a matter of debate.

Close reduction and percutaneous fixation has the benefit of minor operation as compared to open reduction and internal fixation<sup>(7)</sup> and it is much more economic for the patient compared to the plates that are used for open reductions. Percutaneous wire fixation has its own complications like pin site infections, pin breakage, tendon and nerve injury during wire insertion,

still they are less numerous and less common compare to complications we may see in open reduction and internal fixation technique<sup>(8)</sup>.

There are two distinct method of K wire fixation among the various methods which have been described which have gained popular acceptance. In one method K wires are inserted through the fracture sites and in other insertion is across the fracture sites. The former in which two or three wire are inserted through fracture sites and cross the opposite cortex, was first described by Kapandji in 1976 and various modification has been introduced since then<sup>(9)</sup>. The later also is done through many different modifications, of these one in which two K wires are inserted through radius styloid and one through lunate articular facet has become more popular<sup>(10)</sup>.

Kapandji technique has some theoretical advantages as it provides a more dynamic fixation compared to Extrafocal technique which is supposedly more static<sup>(11)</sup>. Although this may lead to a greater chance of collapse in Kapandji technique due to its dynamic nature but this has not been proven.

There has been little literature that compares the radiological and functional outcomes of these two technique, Hence the purpose of our prospective study is to analyze and compare the radiological and functional outcomes of Kapandji technique and Extrafocal technique of K wire fixation in Extra articular distal radius fractures.

## II. MATERIALS AND METHODS

This prospective study had been conducted in the Department of Orthopaedics, GCS Medical College and Research Hospital, Ahmedabad. From January 2018 to March 2020, 60 patients with extra articular distal radius fracture were included in this prospective study after obtaining informed consent regarding the same. Out of these 30 went under extra-focal technique and 30 went under Kapandji technique of K wire fixation. The exclusion criteria were comminuted fractures, open fractures, intra-articular extension, skeletally immature patient and fracture of duration more than 2 weeks. We randomly selected the method of fixation. Out of 30 patients in the Kapandji technique group, 14 (46.67%) were male and 16 (53.33%) were female and in the extra-focal fixation technique group 13 (43.33%) were male and 17 (56.67%) were female. Mean age in the Kapandji group was 49.33 years and in the extra-focal group it was 46.67 years.

### a) Technique

The Kapandji technique was performed under general or local anaesthesia, the reduction was achieved by traction and counter traction method under fluoroscopic guidance. After making a stab wound within the first and second extensor compartment and

mobilizing the underlying structures, first wire was inserted parallel and directly through the fracture site with caution not to damage the radial nerve and tendons. Then the wire was levered 45degree obliquely proximally and was drilled to the opposite cortex; this wire was occasionally also use to achieve radial height if traction alone provided in adequate height. Second and third wires inserted through third-fourth and fourth-fifth extensor compartment, respectively by the same method helping achieve and maintain the palmar tilt as well.

The extra-focal technique was performed under general or local anaesthesia, then close reduction was achieved by traction and counter traction and then with proper flexion the reduction was achieved in all cases under fluoroscopy guidance. After this, we make the first stab wound through first and second extensor compartment and after mobilization of underlying tendons and soft tissue we inserted the first K wire through radial styloid and cross the fracture site and go through the opposite cortex about 1-2 mm. The second K wire was passed from the lunate fossa cross the fracture site piercing the opposite cortex for about 1-2mm and the third wire was again passed through the radial styloid cross the fracture site and go through the opposite cortex about 1-2 mm and distal to the piercing of the cortex done by the previous k wire inserted from the styloid. Preoperative, postoperative and 6 month follow up images of the 2 techniques is given in Figure 1.

After surgery in both groups we immobilized the limb in below elbow cast for 5 weeks after which cast was removed and k-wires were removed. Radiographs were taken at 1 month, 3 months and 6 months post operatively. All patients followed proper physiotherapy protocol after 5 weeks of surgery. Radiological parameters including Ulnar variance, Palmer tilt, Radial length and Radial inclination were measured in both groups in every patient in fractured and non fractured side and statistical comparison were made between the groups 6 months postoperatively. Functional outcomes were also assessed using Gartland and Werleyscore<sup>(12)</sup> in both groups 6 months postoperatively.





3)

4)



**Figure 1:** A. shows Kapandji technique 1) pre op radiographs, 2) immediate post op radiographs, 3), 4) 6 months follow up radiographs compared to opposite non fracture side. B. shows Extra Focal technique 1) pre op radiographs, 2) immediate post op radiographs, 3), 4) 6 months follow up radiographs compared to opposite non fracture side.

### III. RESULTS

From January 2018 to March 2020, 60 patients with extra articular distal radius fracture were included in this prospective study. Out of these, 30 were selected for Kapandji technique and other 30 for Extra focal technique. We had no complication during any surgery and there were no changes to plan after initiation of surgery. Close reduction was obtained in all cases and there were no wire breakage. No vascular, neurological or tendon related complications were noted post operatively.

Functional assessment was done at 6 months follow up in all cases. It was done using the Gartland and Werleyscore<sup>(12)</sup>. In the Kapandji group 13(43.33%) patients showed excellent results while 17(56.67%) patients showed good results at 6 months follow up while in Extra Focal group 12(40%) patients showed excellent results while 18(60%) patients showed good results. Table 1 summarizes the functional outcome.

**Table 1:** Summarizes the functional outcome of the two groups of extra articular distal radius fracture fixation using Gartland and Werly score at 6 months follow up post operatively.

Gartland and Werley score	Kapandji Technique	Extra Focal Technique
Excellent(0-2)	13	12
Good(3-8)	17	18
Fair(9-20)	0	0
Poor(>20)	0	0

Radiological assessment was done in detail regarding 4 parameters namely Ulnar Variance, Palmar Tilt, Radial Length and Radial inclination. At 6 month follow up radiographs of every patient of the fractured and non fractured site was taken and the above mentioned parameters were measured. Mean and standard deviation for all parameters in both groups of study and of both fractured and non fractured limbs were calculated. The data was analyzed and compared. It was found that the distribution of data was non normal

and hence appropriate statistic tests were used to compare the data.

The mean Ulnar variance in Kapandji group at 6 month follow up was 0.63mm (standard deviation 0.54mm) on the fractured side and it was 0.67mm (standard deviation 0.56mm) on the non fractured side while the mean Ulnar variance in Extra Focal group at 6 month follow up was 0.57mm (standard deviation 0.54mm) on the fractured side and it was 0.67mm (standard deviation 0.53mm) on the non fractured side.

The mean Palmar tilt in Kapandji group at 6 month follow up was 11.2 degrees (standard deviation 0.66 degrees) on the fractured side and it was 11.33 degrees (standard deviation 0.61 degree) on the non fractured side while the mean Palmar tilt in Extra Focal group at 6 month follow up was 10.67 degree (standard deviation 0.96 degree) on the fractured side and it was 12 degree (standard deviation 0.59mm) on the non fractured side.

The mean Radial length in Kapandji group at 6 month follow up was 15mm (standard deviation 1.78mm) on the fractured side and it was 16.33mm (standard deviation 0.99mm) on the non fractured side while the mean Radial length in Extra Focal group at 6

month follow up was 14.33mm (standard deviation 1.49mm) on the fractured side and it was 15.67mm (standard deviation 0.96mm) on the non fractured side.

The mean Radial inclination in Kapandji group at 6 month follow up was 22.03 degrees (standard deviation 2.95 degrees) on the fractured side and it was 23.67 degrees (standard deviation 2.59 degrees) on the non fractured side while the mean Radial inclination in Extra Focal group at 6 month follow up was 22.93 degrees (standard deviation 2.08 degrees) on the fractured side and it was 24.67 degrees (standard deviation 1.61 degrees) on the non fractured side. Table 2 summarizes the various radiological findings.

*Table 2:* Summary of radiological findings at 6 month followup in both groups

Radiological Parameter	Limb side	Kapandji Technique		Extra Focal Technique	
		Mean	Standard deviation	Mean	Standard deviation
Ulnar Variance (in mm)	Fractured	0.63	0.54	0.57	0.54
	Non fractured	0.67	0.56	0.67	0.53
Palmar Tilt (in degrees)	Fractured	11.2	0.66	10.67	0.96
	Non fractured	11.33	0.61	12.00	0.59
Radial Length (in mm)	Fractured	15.00	1.78	14.33	1.49
	Non fractured	16.33	0.99	15.67	0.96
Radial Inclination (in degrees)	Fractured	22.03	2.95	22.93	2.08
	Non fractured	23.67	2.59	24.67	1.61

These Radiological parameters in both methods were compared at 6 month follow up between the fractured and non fractured side by using Wilcoxon sign rank test to find any statistically significant difference.

It was found that there was a statistically significant difference between the findings of Radial length and Radial inclination between the fractured and non fractured side ( $p$  value<0.05) in Kapandji group suggesting a statistically significant loss of these parameters post surgery at 6 months follow up; though the difference in each patient's radiological parameter of fractured side compared to non fractured side remained acceptable(excellent to good range) as per the Sarmiento modification of Lindstorm criteria<sup>(13)</sup>.

It was found that there was a statistically significant difference between the findings of Palmar Tilt, Radial length and Radial inclination between the fractured and non fractured side ( $p$  value<0.05) in Extra Focal group suggesting a statistically significant loss of these parameters post surgery at 6 months follow up; though the difference in each patient's radiological parameter of fractured side compared to non fractured side remained acceptable(excellent to good range) as per the Sarmiento modification of Lindstorm criteria<sup>(13)</sup>.

The difference between the non fractured and the fractured side was calculated for every patient in

each of the 4 above mentioned radiological parameters suggesting the loss for the said parameters at 6 months follow up; and the data so obtained in both groups was compared using Mann Whitney U test. It was found that the loss of Ulnar variance, Radial length and Radial inclination in both groups was comparable but a statistically significant difference was found when comparing the loss of Palmar Tilt in both groups ( $p$  value<0.05); suggesting that in our study the loss of palmar tilt at 6 month follow up in Kapandji technique was significantly less than the loss of palmar tilt at 6 months follow up in Extra Focal technique.

#### IV. DISCUSSION

Distal end radius extra articular fracture is one of the commonest fractures that aorthopaedic surgeon has to treat. Although it is easy to diagnose there are many treatment options available like conservative cast management, k wire fixation by various methods, external fixator which may be joint spanning or non joint spanning, open reduction and internal fixation with plates and now recently augmentations in osteoporotic bones with light curable polymer and fixation has also been described. Given the wide selection among treatment options there still isn't any gold standard



treatment option and no clear cut indications for selecting specific treatment options. Percutaneous K wire fixation remains the most commonly performed surgery for these fractures.

One of the first methods of wire fixation was done by Lambotte in 1908 that used 1 or 2 wire to fix the fracture through radial styloid<sup>(14)</sup>. Although the results were poor and revealed inability in maintaining the radial height but it did begin a long way of multiple methods of fixations that has lasted till now.

Cross wire fixation was introduced by Stein and Katz in 1975, who fixed the fracture with one wire through radius styloid and one through radius ulnar and dorsal cortex into volar cortex<sup>(15)</sup>. That method could maintain the radial inclination in 100%, and radial length in 98.14% of the patients.

Kapandji described a technique in which he inserted wires inside the fracture side and drilled to the opposite cortex instead of conventional cross fixation wiring method<sup>(16)</sup> but he did not report these results. Epinette in 1982 reported his series results with Kapandji technique in which there were 84% excellent and good result<sup>(17)</sup>. Another study that assess the Kapandji technique was by Greeting and Bishop in 1993 in Mayo Clinic in which they reported 84.6% excellent and good Mayo Clinic wrist score and also they advocated usage of this technique in fractures in which there is no volar cortex comminution or joint involvement. In our study it was found that Kapandji method gives 43.33% excellent and 56.67% good results while Extra focal fixation method gives 40% excellent and 60% good results by Gartland and Werley score at 6 months follow up; Although the scores in both groups were comparable and the difference was not statistically significant.

Sayed Mehdi Mirhamidi et al in their prospective comparative study between kapandji and Extra focal K wire fixation reported that Palmar tilt were preserved better in the Kapandji group (12.41) than the extra-focal group (10.61) also it was not statistically significant but it may be because of the buttress effect of the second and third wire on the distal fragment<sup>(18)</sup>. In our study we found that the loss of palmar tilt on the fractured side opposed to non fractured side in the Kapandji group was less as compared to the loss in Extra Focal fixation and this difference was found to be statistically significant ( $p$  value  $< 0.05$ ).

It is perceived that radial length is the most important radiologic and anatomic parameters that define the clinical outcome<sup>(19)</sup> and it appears that any technique that maintain the radial length gives better functional result<sup>(15)</sup>. Our study showed comparable outcome in maintaining radial length and radial inclination in both Kapandji fixation and Extra focal fixation group and there was no statistically significant difference in these outcomes at 6 month follow up. Also in our study we found that in all the patient in both groups the radial length and radial inclination remained

in excellent to good range as per the Sarmentio modification of Lindstorm criteria<sup>(13)</sup>.

In 1994 a comparative study between Kapandji technique and trans-radial wire technique, pain and Reflex Sympathetic Dystrophy (RSD) were more common in the Kapandji group but the range of motion was better in the Kapandji group till six weeks and after that became insignificant<sup>(20)</sup>. In our study 4 cases in Kapandji group developed RSD and 3 cases in Extra Focal group developed RSD. The range of motion in both groups were comparable at 6 months interval with no statistically significant difference.

One of the drawbacks of our study is that in order to have a common post operative protocol we immobilized the fractured limb in both the study groups for 5 weeks in below elbow cast so we were not able to replicate the early range of motion demonstrated by some studies in the Kapandji method of fixation<sup>(20)</sup>; although probably as a result of this we had fewer incidence of pain in follow up of patients in Kapandji group which became comparable to that of Extra Focal fixation group which is different from the result of other studies<sup>(20)</sup> showing higher incidence of pain in Kapandji Technique post operatively. Another limitation of our study is less number of patients and a lower follow up duration (6 months) which can be improved by a longer duration wider scale study.

## V. CONCLUSION

We conclude that both Kapandji and Extra-focal K wire fixation of Extra articular Distal Radius fracture provided excellent to good functional outcome as well as an acceptable radiological outcome at 6 months postoperative followup; given that appropriate immobilization followed by proper physiotherapy is followed by the patient.

## ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to Dr. Jyotish G. Patel, Head of the department of Orthopaedics, Gcs Medical College, Hospital and Research Centre for his guidance, inspiration, teaching and valuable suggestion which helped in conducting this study.

I would like to acknowledge all the faculties and residents in the Orthopaedics department of our institute for their contribution in patient counselling, patient management, data collection and follow up.

I would like to thank Mr. Vasu G. Rathod (M.Sc. Statistics) for his expertise on the statistical analysis in this study.

I also would like to appreciate the patience and cooperation of all the patients and their families who took part in this study. I would also acknowledge Gcs Hospital and the Ethics committee for allowing me to conducting the study.

Last but not the least I owe a lot to my parents, my wife, my sister and my family for their unconditional support, motivation, love, guidance in all the challenges of life striving to achieve my dreams.

*Compliance with Ethical Standards*

*Conflict of interest:* None declared

*Ethical approval:* The study was approved by the institutional ethics committee.

All patients gave an informed consent for participating in this study.

*Funding:* No funding sources

## REFERENCES RÉFÉRENCES REFERENCIAS

1. Fernandez DL, Martin CJ. Classification and conservative treatment of distal radius fractures. In: Watson HK, Weinzweig J, eds. *The wrist*. Philadelphia: Lippincott Williams & Wilkins. 2001. pp: 277-298.
2. Colles A. Fractures of the carpal extremity of the radius. *Edinb Med Surg J* 1814; 10: 182-186.
3. Lidstrom A. Fractures of the distal end of the radius. A clinical and statistical study of end results. *Acta Orthop Scand* 1959; 30 suppl 41:1-118.
4. Cooney WP, Linscheid RL, Dobyns JH. External pin fixation for unstable Colles' fractures. *J Bone Joint Surg Am* 1979; 61: 840-845.
5. Brady O, Rice J, Nicholson P, Kelly E, O'Rourke SK. The unstable distal radial fracture one year post Kapandji intrafocal pinning. *Injury* 1999; 30: 251-255.
6. Orbay JL, Fernandez D. Volar fixation for dorsally displaced fractures of the distal radius: a preliminary report. *J Hand Surg [Am]* 2002; 27: 205-215.
7. Abbaszadegan H, Jonsson U, von Sivers K. Prediction of instability of Colles' fractures. *Acta Orthop Scand* 1989; 60: 646-650.
8. Kaempffe FA, Wheeler DR, Peimer CA, Hvidak KS, Ceravolo J, Senall J. Severe fracture of the distal radius: effect amount and duration of external fixator distraction on outcome. *J Hand Surg [Am]* 1993; 18: 33-41.
9. Kapandji A. L'ostéosynthese par double embrochage intra-focal: traitement fonctionnel des fractures non articulaires de l'extrémité inférieure du radius. *Ann Chir* 1976; 30: 903-908.
10. Rayhack JM. The history and evolution of percutaneous pinning of displaced distal radius fractures. *Orthop Clin North Am* 1993; 24: 287-300.
11. Epinette J, Lehut J, Decoux J. Pouteau-Colles' fractures: double intrafocal pinning according to Kapandji. *Ann Chir Main* 1982; 1: 71-83.
12. Changulani M, Okonkwo U, Keswani T, Kalairajah Y. Outcome evaluation measures for wrist and hand: which one to choose? *Int Orthop*. 2008 Feb; 32(1): 1-6. doi: 10.1007/s00264-007-0368-z. Epub 2007 May 30.
13. Sarmiento A, Pratt GAW, Berry NC, Sinclair WF. Colles' fractures: functional bracing in supination. *J Bone Jt Surg*. 1975; 57A: 311-317.
14. *Fractures and Injuries of the Distal Radius and Carpus E-Book: The Cutting Edge-Expert Consult: Online and Print* David J Slutsky, A Lee Osterman Elsevier Health Sciences, 2008.
15. Stein A, Katz S. Stabilization of comminuted fractures of the distal inch of the radius: Percutaneous pinning. *Clin Orthop* 1975; 108: 174-181.
16. Kapandji A. L'ostéosynthese par double embrochage intrafocal: Traitement fonctionnel des fractures non articulaires de l'extrémité inférieure du radius. *Ann Chir* 1976; 30: 903.
17. Epinette J, Lehut J, Decoux J, et al. Fracture de Pouteau-Colles: double embrochage intrafocal en berceau selon Kapandji. A propos d'une série homogène de soixante-douze cas. *Ann Chir Main* 1982; 1: 71.
18. Mirhamidi SM, Bayat FM. A prospective comparison between Kapandji and percutaneous extra-focal fixation in extra articular distal radius fractures. *Int J Clin Exp Med*. 2013; 6(2): 133-139.
19. Trumble TE, Wagner W, Hanel DP, Vedder NB, Gilbert M. Intrafocal (Kapandji) pinning of distal radius fractures with and without external fixation. *J Hand Surg [Am]* 1998; 23: 381-394.
20. Lenoble E, Dumontier C, Goutallier D, Apoil A. A prospective comparison between trans styloid and kapandji fixations. *J Bone Joint Surg (Br)* 1995; 77-B: 562-7.



This page is intentionally left blank



GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM  
Volume 21 Issue 2 Version 1.0 Year 2021  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

## Acrometastasis: A Rare Entity. A Proximal Radius Case

By Holgado-Moreno Esperanza, Cabezuelo-Díaz-Miguel Eduardo,  
Sánchez-Sánchez Félix, Alarma-Barcia Leticia & Guijarro-Leo Sandra

**Abstract-** Bone metastases under de knee and elbow (acrometastasis) are rare. We present the case of a patient diagnosed with lung adenocarcinoma, with a lesion in the right proximal radius. Radiological imaging through CT and MR suggested metastatic lesion, which anatomopathological results confirmed. As the presence of these markers provides a poor outlook, radiotherapy was initially considered. However, given the clinical stability of the patient and the limited amelioration observed, surgical treatment was finally conducted.

**Keywords:** *acrometastasis, lung, radio, surgery.*

**GJMR-H Classification:** NLMC Code: WE 168



*Strictly as per the compliance and regulations of:*



# Acrometastasis: A Rare Entity. A Proximal Radius Case

Holgado-Moreno Esperanza <sup>α</sup>, Cabezuelo-Díaz-Miguel Eduardo <sup>σ</sup>, Sánchez-Sánchez Félix <sup>ρ</sup>,  
Alarma-Barcia Leticia <sup>ω</sup> & Guijarro-Leo Sandra <sup>¥</sup>

**Abstract-** Bone metastases under de knee and elbow (acrometastasis) are rare. We present the case of a patient diagnosed with lung adenocarcinoma, with a lesion in the right proximal radius. Radiological imaging through CT and MR suggested metastatic lesion, which anatomopathological results confirmed. As the presence of these markers provides a poor outlook, radiotherapy was initially considered. However, given the clinical stability of the patient and the limited amelioration observed, surgical treatment was finally conducted.

**Keywords:** acrometastasis, lung, radio, surgery.

## I. INTRODUCTION

**B**one metastatic disease is the most common malignant neoplasia of the bone. The term acrometastasis refers to the metastases produced in the distal extremities under knee and elbow. They represent 0,1% of all bone metastases<sup>1</sup> having a greater incidence in males<sup>2</sup>. The metastases in these regions usually indicate a worse outlook. Most of these metastases are produced by bronchopulmonary and renal tumors, where pulmonary origin represents nearly half of these cases<sup>3</sup>, with greater incidence in the upper extremities.

Although most metastatic lesions appear during disease, occasionally they appear as the first symptom, in up to 10% of cases<sup>4-5</sup>.

Patients with distal bone metastasis have a poor outlook and, those in which these are the first signs of the disease have worse survival prospects, with a median of 3 to 9 months<sup>5-6</sup>.

## II. CASE REPORT

We present the case of a 65 years old male with a pulmonary adenocarcinoma diagnosed, T4N2M0, IIIB stage, ROS1, and no ALK translocation, non-mutated EGFR, negative BRAF, PDL1 positive (1%). Ex-smoker for 14 years of a packet a day since age 15. The patient received chemotherapy (CBP/Alimta) + concomitant thoracic radiotherapy and is currently in maintenance treatment with Durvalumab.

The patient came to the emergency room of our hospital with pain in the proximal third of his right forearm, which had been ongoing for approximately one month and a half, with no record of previous trauma.

During the physical examination, he presented pain in the proximal third of the right radius and the anterolateral side of his forearm, accompanied by a loss of strength in the wrist. The supination ability was limited to 20°, with complete pronation and flexion and extension. Neurovascular distal exploration preserved.

In further tests, the following could be observed: Forearm RX: moth-eaten lytic lesion, poorly defined with cortical destruction of the proximal third with no evidence of associated fracture, compatible with bone metastasis. (Figure 1).

Author <sup>α</sup> p <sup>ω</sup> ¥: Department of Orthopedic surgery, Hospital Universitario de Toledo. Toledo. e-mail: eholgadamoreno@gmail.com

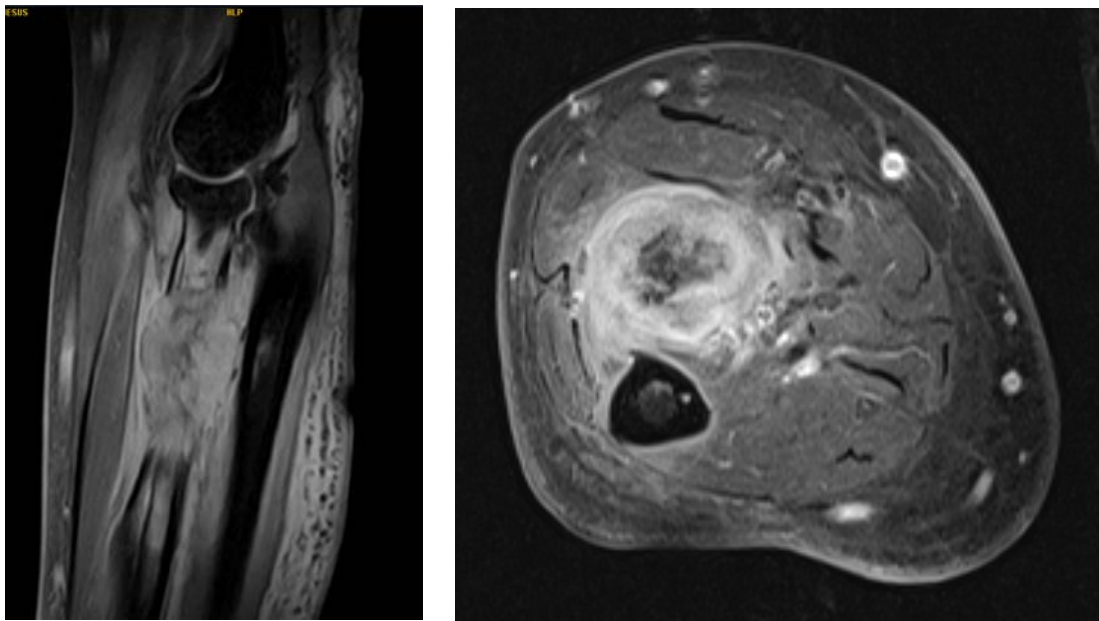
Author <sup>σ</sup>: Department of Orthopedic surgery, Hospital La Mancha Centro. Alcázar de San Juan.



**Figure 1:** Radiological imaging AP (A) and lateral (B) of the right elbow where almost complete destruction of the proximal radius can be observed.

Subsequently, the study is extended with an MRI (Figure 2) showing a lytic lesion with cortical invasion and soft-tissue mass in the proximal radius

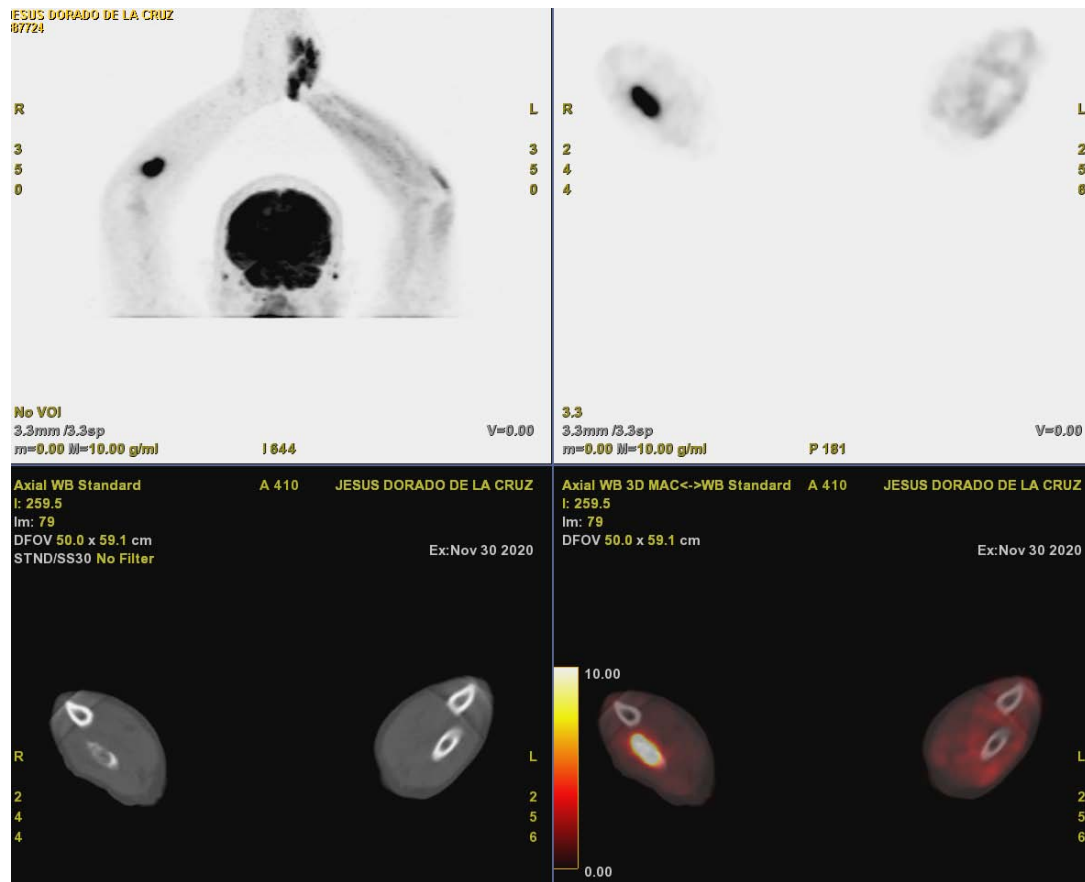
compatible with bone metastasis, invading the supine muscle and probably the extensor digitorum muscle as well as the distal insertion of the biceps tendon.



**Figure 2:** Sagittal image (A) and axial (B) of the pre-operative MR of the right elbow, which shows bone invasion and the extension of the associated soft-tissue mass.

With these findings, the medical oncology service requests a PET CT scan (figure 3) which shows the lesion in the right proximal radius and a partial improvement of the known pulmonary masses alongside a complete response of the bilateral hilar and mediastinal adenopathies.

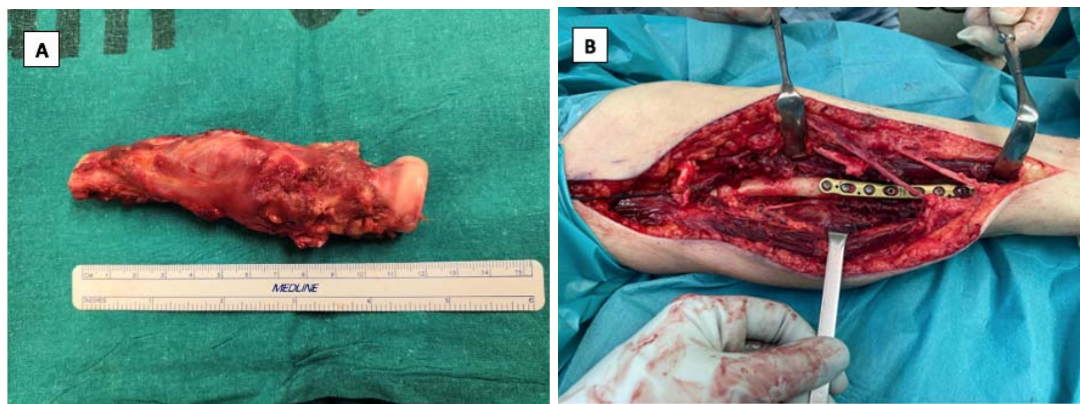




**Figure 3:** PET TAC image showing an intense increase in metabolic activity in a lytic lesion in the right proximal radius (SUV max 17.8)

Due to the radiological findings alongside the location and extension of the lesion, a palliative radiotherapy treatment is initiated. Six weeks after the radiotherapy treatment has ended, the patient attends a check-up, claiming to feel better despite ongoing pain

and limited functioning. A new MR of the right elbow is conducted finding a progression in the bone lesion. This motivates surgical treatment through ample resection and reconstruction with structural bone allografts from a bone bank. (Figure 4).



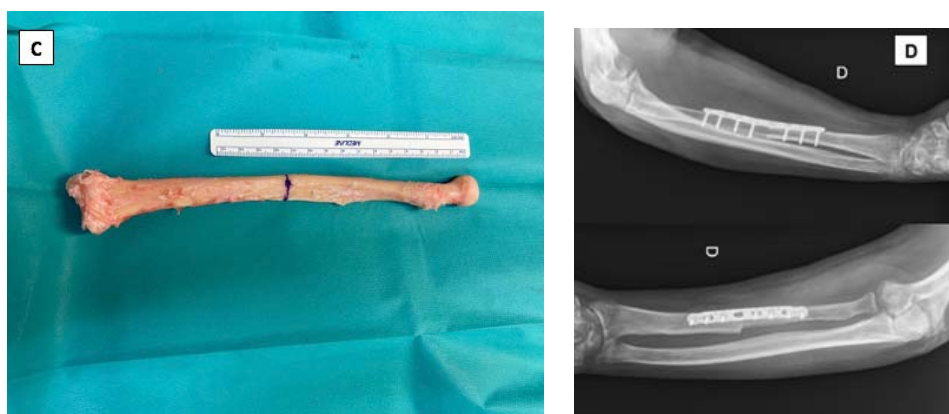


Figure 4

- A. Tumor resection of the proximal radius with soft-tissue mass.
- B. Bone bank allografts used for bone reconstruction of the post-resection defect.
- C. Intraoperative image after reconstruction and osteosynthesis.
- D. Postoperative AP and LAT Radiological image of the right elbow.

After surgery, a nerve paresis was observed of the radial nerve, which the patient has partially recovered with the help of rehabilitation. Clinically, the patient is no pain and has a mobility limitation of approximately  $20^{\circ}$  for supination and  $10^{\circ}$  for the extension.

### III. DISCUSSION

Bone metastases can constitute the first symptom of a neoplastic process still unknown or appear concomitantly within an already diagnosed condition. The most important primary tumors of bone metastasis are prostate, breast, pulmonary, renal, and thyroid. Of these, prostate, breast, and lung constitute over 65% of all bone metastases<sup>7</sup>.

Clinically, the patient presents localized pain, progressive, which does not lessen at night nor improve with rest. Occasionally, it can be accompanied by soft-tissue mass<sup>8</sup>, which depending on location and size, can require clinical practice due to the compression of neighboring structures.

Radiologically, we find lesions that are typically lytic, with a varying pattern of bone destruction but typically geographic with cortical affectation, without periosteal reaction in most cases, and occasionally with an associated element of soft-tissue mass. In fact, given its clinical and radiological characteristics, they can imitate those of an infection or other non-neoplastic processes such as inflammatory or rheumatoid arthritis<sup>4</sup>, producing a delay in obtaining a definite diagnosis, mainly in patients without a known primary tumour. As a result, inadequate treatment is likely to take place.

The process by which bone metastases appear is still not well defined, but it could be due to a diffusion system in the blood flow different from habitual lymphatic media, thus explaining the tumors cells' preference for distal regions which are richly

vascularised<sup>3</sup>. Libson and col. show how the location of the metastasis depends on the venous system which different affected organs drain to. Hence, malignant neoplasm located at a supradiaphragmatic level such as the lung, tends to produce metastasis under the elbow, in contrast, subdiaphragmatic neoplasm as the colon, urothelial, uterus, and prostate tend to make metastasis under the knee<sup>5,8,9</sup>.

Currently the survival of cancer patients has increased to a great extent because of the improvement of oncological treatment, enabling the survival of patients with metastatic disease. This improvement in survival, at times, makes us reconsider, as surgeons, our therapeutic performance.

This increase in survival means pain control is frequently the main goal when treating these patients. The general state, the location of the lesion, and the type of primary cancer help establish the treatment which the surgeon must use<sup>10</sup>.

Due to the fact that acrometastases constitute a rare entity, no treatment protocol has been established. Each case must be examined separately in order to establish the best treatment according to the needs of each patient. In general terms, treatment tends to be palliative, including an adequate resection of the tumor, enabling pain relief and allowing fast recovery while preserving the maximal functional performance of the affected extremities.

Within the different treatments used, we mainly find radiotherapy, the tumor resection, and the combination of both<sup>3,11</sup>.

### IV. CONCLUSION

In conclusion, acrometastasis is an infrequent entity. However, due to the advance in the medical treatment of cancer, hence higher life expectancy of

patients, there also exists a significant increase in the diagnoses of metastatic bone lesions.

In patients with a history of cancer, those with unusual symptoms, or those who do not respond to certain standard treatments, a differential diagnosis must be established, which includes bone metastasis diagnosis.

## REFERENCES RÉFÉRENCES REFERENCIAS

1. Kerin R. Metastatic tumors of the hand. A review of the literature. *J Bone Joint Surg Am.* 1983 Dec; 65(9): 1331-5. PMID: 6654944.
2. Flynn CJ, Danjoux C, Wong J, Christakis M, Rubenstein J, Yee A, Yip D, Chow E. Two cases of acrometastasis to the hands and review of the literature. *Curr Oncol.* 2008 Oct; 15(5):51-8. doi: 10.3747/co.v15i5.189. PMID: 19008991; PMCID: PMC2582515.
3. Asencio G, Hafdi C, Pujol H, Allieu Y. Osseous metastases in the hand. A general review of three cases. *Ann Chir Main.* 1982; 1(2): 137-45. English, French. doi: 10.1016/s0753-9053(82)80069-0. PMID: 6927376.
4. Abrahams TG. Occult malignancy presenting as metastatic disease to the hand and wrist. *Skeletal Radiol.* 1995 Feb; 24(2): 135-7. doi: 10.1007/BF00198077. PMID: 7747180.
5. Long LS, Brickner L, Helfend L, Wong T, Kubota D. Lung cancer presenting as acrometastasis to the finger: a case report. *Case Rep Med.* 2010; 2010: 234289. doi:10.1155/2010/234289
6. Libson E, Bloom RA, Husband JE, Stoker DJ. Metastatic tumours of bones of the hand and foot. A comparative review and report of 43 additional cases. *Skeletal Radiol.* 1987; 16(5): 387-92. doi: 10.1007/BF00350965. PMID: 3306939.
7. Fraguas a, Portabella F, Minguell J, Guerra E. Diagnóstico y tratamiento de las metástasis óseas. Editorial Panamericana. 2021
8. Leeson MC, Makley JT, Carter JR. Metastatic skeletal disease distal to the elbow and knee. *Clin OrthopRelat Res.* 1986 May; (206): 94-9. PMID: 3708998.
9. Bahrabadi M, Otoukesh B, Moghtadaei M, Hoseinzadeh S, Amiri S. Foot Metastasis: Review of 38 Cases. *Arch Bone Jt Surg.* 2021 Jan; 9(1): 122-125. doi: 10.22038/abjs.2020.49792.2474. PMID: 33778125; PMCID: PMC7957098.
10. Ratasvuori M, Wedin R, Keller J, Nottrott M, Zaikova O, Bergh P, Kalen A, Nilsson J, Jonsson H, Laitinen M. Insight opinion to surgically treated metastatic bone disease: Scandinavian Sarcoma Group Skeletal Metastasis Registry report of 1195 operated skeletal metastasis. *Surg Oncol.* 2013 Jun; 22(2): 132-8. doi: 10.1016/j.suronc.2013.02.008. Epub 2013 Apr 4. PMID: 23562148.
11. Mavrogenis AF, Mimidis G, Kokkalis ZT, Karampi ES, Karampela I, Papagelopoulos PJ, Armaganidis A. Acrometastases. *Eur J Orthop Surg Traumatol.* 2014 Apr; 24(3): 279-83. doi: 10.1007/s00590-013-1311-1. Epub 2013 Sep 8. PMID: 24013815.

### Credit authorship contribution statement

All authors have contributed significantly, and all authors are in agreement with the content of the manuscript.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review from the Editor-in-Chief of this journal on request.

### Conflict of interest

All authors disclose any financial and personal relationships with other people or organizations that could inappropriately influence our work.



This page is intentionally left blank



GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM  
Volume 21 Issue 2 Version 1.0 Year 2021  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

# Are Prophylactic Antibiotics Necessary in Primarily Closed Lacerated Wounds?

By Dr. Faheem Quraishi, Dr. Iram Quraishi, Dr. A.G. Quraishi  
& Dr. Kashif Momin

**Abstract- Objective:** The objective of present study was to find if antibiotics really benefit in preventing infection in lacerations anywhere in body, provided copious irrigation & meticulous surgical debridement is performed. Also, when wounds are contaminated. The study also took into consideration effect of length & depth of wound on wound infection.

**Methods:** This longitudinal study was performed between November 2016 to June 2021 at Orthocare accident hospital & research center, India. Patients were allocated in two groups. Patients in Group A(n=221) were those who have received oral Amoxicillin & Clavulanic acid for 7 days as per standard protocol<sup>21</sup> and Group B (n = 189) patients did not receive antibiotics as per protocol in previous studies<sup>17</sup>. infection rate was measured in both group & measured outcome was analyzed with SPSS version 20, IBM. Categorical data was presented as percentages and analyzed with Chi square or Fisher Exact test.

**Keywords:** wound infection, antibiotic prophylaxis, lacerated wounds, contaminated wounds, wound length, wound debridement, copious irrigation.

**GJMR-H Classification:** NLMC Code: WE 168



*Strictly as per the compliance and regulations of:*





# Are Prophylactic Antibiotics Necessary in Primarily Closed Lacerated Wounds?

Dr. Faheem Quraishi <sup>α</sup>, Dr. Iram Quraishi <sup>ο</sup>, Dr. A.G. Quraishi <sup>ρ</sup> & Dr. Kashif Momin <sup>ω</sup>

**Abstract- Objective:** The objective of present study was to find if antibiotics really benefit in preventing infection in lacerations anywhere in body, provided copious irrigation & meticulous surgical debridement is performed. Also, when wounds are contaminated. The study also took into consideration effect of length & depth of wound on wound infection.

**Methods:** This longitudinal study was performed between November 2016 to June 2021 at Orthocare accident hospital & research center, India. Patients were allocated in two groups. Patients in Group A (n=221) were those who have received oral Amoxicillin & Clavulanic acid for 7 days as per standard protocol<sup>21</sup> and Group B (n = 189) patients did not receive antibiotics as per protocol in previous studies<sup>17</sup>. Infection rate was measured in both group & measured outcome was analyzed with SPSS version 20, IBM. Categorical data was presented as percentages and analyzed with Chi square or Fisher Exact test. Quantitative data was presented as Mean & Median, range wherever applicable, and analyzed using student's t test or Mann Whitney U test.

**Results:** We found no significant difference in infection rate between Group A (2 out of 221) & group B (1 out of 189 patients),  $p < 0.05$ .

**Conclusion:** This study shows that prophylactic antibiotic doesn't prevent infection in lacerated wounds sutured primarily, even if wounds are contaminated. Copious irrigation & meticulous debridement remain more crucial than antibiotics in preventing wound infection. Wound length & depth also doesn't correlate with wound infection.

**Keywords:** wound infection, antibiotic prophylaxis, lacerated wounds, contaminated wounds, wound length, wound debridement, copious irrigation.

## I. INTRODUCTION

Traumatic Lacerated wounds are routinely managed in emergency department on day care basis. The main aim of the treating surgeon is to achieve aesthetic & fast healing of wounds. Wound infection remains a major threat not only to this outcome but also adds significant morbidity. It has been prevented for ages by copious irrigation, good wound debridement and antibiotic administration<sup>1</sup>.

Wound irrigation washes out debris & dilutes bacterial load. Irrigation has no proven effect on wound healing & infection but most of the studies support it. Instead, several RCT's prefer tap water over sterile saline for irrigation<sup>2,3,4,5,6</sup>. Wheeler et al recommended 50 to 100 ml of irrigation solution per centimeter of wound to bring bacterial load below acceptable  $10^5$  organism per ml<sup>7</sup>. Also use of clean non sterile gloves instead of sterile gloves has hardly found to have any effect on wound infection<sup>8</sup>.

Surgical debridement should aim at removal of debris and contaminants and excision of dead tissues. Debridement should be done in moderation. It should serve its very purpose but also should not devitalize skin and hamper functionality.

By and large, antibiotics take the maximum attention of treating surgeon. Though, Antibiotic prophylaxis guidelines exist depending on the contamination of wound, mechanism of injury, infection potential & host predisposition<sup>9</sup>. There is a tendency to prescribe antibiotics fearing infection in almost all types of lacerated wounds. This overt use of antibiotics gives rise to bacterial resistance & adds to the cost of patient. In presence of contradictory studies, how far prophylactic antibiotics really benefit in lacerated wounds is unclear<sup>10,11,12</sup>.

Many studies evaluated role of prophylactic antibiotics in preventing surgical site infection. But very few evaluated use of prophylactic antibiotic in preventing wound infection after suturing of simple contaminated lacerations<sup>13,14,15,16</sup>. In 1997 Cassell et al concluded that antibiotics were unnecessary for sharp upper limb lacerations, provided good surgical debridement is done<sup>17</sup>. Taking his observation further, the objective of present study was to find if antibiotics really benefit in preventing infection in lacerations anywhere in body, provided copious irrigation & meticulous surgical debridement is performed. Also, when wounds are contaminated.

## II. MATERIAL & METHODS

### a) Study

This was a longitudinal study to compare outcomes of two groups of patients with lacerated wound sutured primarily treated with & without prophylactic antibiotic. This study was performed between November 2016 to June 2021 at Orthocare

Corresponding Author <sup>α</sup>: Orthocare Accident Hospital & Research Centre, Manmad, Maharashtra state, India 423104.  
e-mails: quraishifaheem@gmail.com, orthosurgeon01@gmail.com



accident hospital & research center located in Manmad, India.

#### b) Patients

Patients attending emergency department lacerated wounds were registered for the study after obtaining their informed consent. Patients were allocated in two groups. Patients in Group A were those who have received oral Amoxicillin & Clavulanic acid for 7 days as per standard protocol<sup>21</sup> and Group B patients did not receive antibiotics as per previous studies.<sup>17</sup>

#### c) Inclusion criteria

All Patients with lacerated wounds presenting within 6 hours of injury that needed primary closure located anywhere in the body were included in the study. All types of simple & contaminated wounds except gunshot wounds were included. These wounds included superficial and deep wounds exposing muscles, tendons and bones.

#### d) Exclusion criteria

All patients with co-morbidities like Diabetes, Hypothyroidism, Renal or Hepatic disorders, Cancer, Rheumatoid arthritis and on steroids or DMARD's were excluded from study. Patients presenting more than 6 hours after injury and patients with grossly contaminated wounds where contaminants were embedded in soft tissues & couldn't be debrided thoroughly were also excluded. Also sewage contaminated wounds were excluded. Wounds extending to joints, having underlying fracture, nerve or vascular injury were also excluded. Patient who did suture removal at other hospitals were also excluded from study.

#### e) Treatment protocol

All patients were treated at presentation in Minor Operation Theatre in Emergency Department. No prophylactic antibiotic before suturing was given & all wounds were anesthetized with 1% Xylocaine local infiltration. All wounds were irrigated with normal saline. Wounds less than 5cm were irrigated with 100ml & wounds more than 5cm were irrigated with 500ml of normal saline respectively. No Povidine iodine solution, Hydrogen peroxide, Spirit or other antiseptic solution were used for wound wash or in wound preparation. Wound closure was done using sterile gloves & draped with sterile hole sheets. Skin closure was done with Nylon & Vicryl was used for subcutaneous closure if required. Dressings were done with sterile gauzes & povidone iodine ointment. Wound dressings were done on day 3 and 7 provided blood soakage was not there. Patients were cautioned against signs of infection like erythema, fever, purulent discharge, foul smell, sudden increase in pain & were advised to report to hospital immediately. Facial wound sutures were removed between day 5-7, elsewhere in body suture removal was done between 10-14 days. In case if infection ensued in Group A (patients on prophylactic oral Amoxycillin &

Clavulanic acid) oral Linezolid was given for 7 days. Whereas, if infection occurred in Group B (patients not on any prophylactic antibiotic) oral Amoxicillin & Clavulanic acid were given for 7 days.

#### f) Data Collection & Statistical analysis

Suturing & Group allotment was done by orthopedic surgeon of the hospital. Suture removal was done by maxillofacial surgeon & medical officer of hospital. Outcomes were recorded by maxillofacial surgeon of hospital. Data was recorded in excel sheet & outcome was analyzed with SPSS version 20, IBM. Categorical data was presented as percentages and analyzed with Chi square or Fisher Exact test. Quantitative data was presented as Mean & Median, range wherever applicable, and analyzed using student's t test or Mann Whitney U test.

### III. RESULTS

During the study duration 653 patients were treated for lacerated wounds. 410 Patients were included in study, of which 308 were male & 102 were female. 221 patients received antibiotics & were included in group A. 189 didn't receive antibiotics in any form hence were included in group B. The average age of patient in group A was 29.10 years with a range 1.5 to 90 years & in group B average age was 29.13 years with a range 2 to 81 years (Table 1).

Since our study included lacerations all around body 81 (group A 44, group B 37) lacerated wounds were located on upper limbs, 105 (group A 57, group B 48) on lower limbs, 221 (group A 119, group B 102) on head & neck & 3 (group A 1, group B 2) on trunk. The average length of wound was 5.1cm (group A 5.5cm, group B 4.7cm) with a range of 1.5 to 26 cm (group A 1.5cm to 26cm, group B 1.5cm to 18cm). (Table 2)

Total 2 patients from group A developed infection & 1 patient from group B developed infection (Table 3). Out of these, one infected patient of Group A was a 63 years old female who had sustained wound over anterior aspect of left knee measuring 10 cm after Road traffic accident. 2<sup>nd</sup> infected patient from Group A was 35 years old male who sustained 7cm laceration over left palmar aspect of hand from dough machine. Both patients were put on oral Linezolid & wound debridement was done. It took 4 weeks for complete healing of wounds. Single patient infected of Group B was a 21 years old male with 6cm laceration over dorsal foot. This patient was put on oral Amoxycillin & Clavulanic acid & wound debridement was done. Wound healed in 24 days completely. All infected wounds healed with no disability except scarring. (Table 4)

We found no significant difference in infection rate between Group A (2 out of 221) & group B (1 out of 189 patients),  $p < 0.05$  (Table 3).

Table 1: Gender &amp; Age distribution of patients

Category	Male No (%)	Female No (%)	Age range & Median
Group A	165(74.66)	56(25.34)	1.5 to 90 years(32 years)
Group B	143(75.66)	46(24.34)	2 to 81 years(38 years)
Total	308(75.16)	102(24.84)	1.5 to 90 years(35 years)

Table 2: Anatomical distribution &amp; length of wounds

Category	Upper limb No (%)	Lower limb No (%)	Head & neck No (%)	Trunk No (%)	Range & Mean Length
Group A	44(19.90)	57(25.79)	119(53.85)	1(0.46)	1.5 to 26cm (5.5cm)
Group B	37(19.6)	48(25.40)	102(54)	2(1)	1.5 to 18cm (4.7cm)
Total	81(19.76)	105(25.61)	221(53.9)	3(0.73)	1.5 to 26 cm (5.1cm)

Table 3: Infection rate in patients

Category	Infected No (%)	Un-infected No (%)
Group A	2(0.9)	219(99.1)
Group B	1(0.5)	188(99.5)
Total	3(0.73)	407(99.27)

Fisher Exact Test,  $p=1$ . The result was not significant,  $p<0.05$

Table 4: Details of infected patients

Patient	Group allotted	Age	Sex	Mode of injury	Location	Length (cm)	Final outcome
1.	A	63	female	Road traffic accident	Knee	10	Healed with scarring
2.	A	35	Male	Dough machine	Hand	7	Healed with scarring
3.	B	21	Male	Road traffic accident	Foot	6	Healed with scarring

#### IV. DISCUSSION

With the proven usefulness of prophylactic antibiotic in preventing surgical site infection, a general consensus started to grow that prophylactic antibiotic have same effect in preventing infection in sutured lacerated wounds. Eventually the focus of treating surgeon started shifting from essential measures like debridement & wound irrigation to antibiotics. It was followed by overt antibiotic usage for sutured wound & still higher antibiotics for various surgical procedures. Then studies started evaluating usefulness of one prophylactic antibiotic over the other. With passing years antibiotics usage completely overshadowed the basic principles of preventing wound infection in sutured wounds.

The intention of the study was to allay apprehension of treating surgeon about wound infection and to bring into notice real measures effective in preventing wound infection. This study evaluated whether prophylactic antibiotic usage was prudent for preventing infection in primarily closed lacerated

wounds. It also emphasized how effective debridement & wound irrigation are in preventing infection.

The study showed in spite of giving antibiotics in effective doses there was no clinically significant benefit of prophylactic antibiotic in lacerated wounds, even contaminated wounds. This was also supported by multiple studies & meta analysis<sup>18,19,20</sup>. In fact, there are added problems with overt antibiotic usage. It adds to development of bacterial resistance, chances of developing allergic reaction & adds to the financial burden of patient.<sup>21,22,23,24</sup> Antibiotic usage must be tailored as per degree of bacterial contamination, type of contaminants like sewage water & host vulnerability factors for infection.

Wound debridement is most essential in preventing wound infection, it removes all dead tissues that act as a good medium for bacterial growth<sup>25,26</sup>, so was emphasized in current study. All wounds were thoroughly debrided by qualified & experienced surgeons. Probably this crucial factor helped preventing wound infection in all the wounds in this study also. Wound irrigation is also effective in preventing infection. It dilutes the bacterial load of wound & washes out

debris, clots & contaminants. It should always be accompanied by good debridement to get optimum results.

Another consensus has been longer the wounds more chances of infection. W.H.O. (World Health Organisation) also recommends antibiotic prophylaxis for wounds longer than 5cm considering increased chances of infections<sup>27</sup>. Though, in current study all infected wounds were greater than 5cm. The correlation between wound length & infection didn't prove significant as many lacerations longer than the infected ones healed uneventfully. Also wound depth didn't affect the outcome. No correlation was found between wound depth & incidence of infection.

Holistically, prophylactic antibiotic usage doesn't allow treating surgeon overlook good wound debridement & irrigation. Infact prophylactic antibiotic usage has no bearing in preventing wound infection if good debridement & copious irrigation is done. Length & depth of wound also appears not to affect incidence of wound infection.

## V. CONCLUSION

This study shows that prophylactic antibiotic doesn't prevent infection in lacerated wounds sutured primarily, even if wounds are contaminated. Copious irrigation & meticulous debridement remain more crucial than antibiotics in preventing wound infection. Wound length & depth also doesn't correlate with wound infection.

Hence, treating surgeon should concentrate on copious irrigation & meticulous debridement rather than relying on prophylactic antibiotics for preventing wound infection.

## ACKNOWLEDGEMENT

Authors wish to express gratitude towards entire hospital staff of Orthocare Accident Hospital & Research Centre, Manmad for contributing to this study by helping in data collection & record keeping.

### Conflict of interest

Authors express no conflict of interest.

<sup>1</sup> Hameed Basir Ghafouri, Barzin Bagheri Behzad, Mohammed Reza Yasinzadeh; Prophylactic antibiotic therapy in contaminated traumatic wounds: two days versus five days treatment.

<sup>2</sup> Worster B, Zawora MQ, Hsieh C. Common questions about wound care. *Am Fam Physician*. 2015; 91(2): 86-92.

<sup>3</sup> Fernandez R, Griffiths R. Water for wound cleansing. *Cochrane Database Syst Rev*. 2012; (2): CD003861

<sup>4</sup> Xia Y, Cho S, Greenway HT, Zelac DE, Kelley B. Infection rates of wound repairs during Mohs micrographic surgery using sterile versus nonsterile gloves: a prospective randomized pilot study. *Dermatol Surg*. 2011; 37(5): 651-656.

<sup>5</sup> Moscati RM, Mayrose J, Reardon RF, Janicke DM, Jehle DV. A multicenter comparison of tap water versus sterile saline for wound irrigation. *Academic Emergency Med*. 2007; 14(5): 404-409.

<sup>6</sup> Weiss EA, Oldham G, Lin M, Foster T, Quinn JV. Water is a safe and effective alternative to sterile normal saline for wound irrigation prior to suturing: a prospective, double-blind, randomised, controlled clinical trial. *BMJ Open*. 2013; 3(1).

<sup>7</sup> Wheeler CB, Rodeheaver GT, Thacker JG, Edgerton MT, Edlich RF. Side-effects of high pressure irrigation. *Surg Gynecol Obstet*. 1976; 143(5): 775-778

<sup>8</sup> Randall T.Forsch, Sahoko H.Little, Christa Williams Laceration repair: Apractical Approach; University of Michigan Medical School, AnnArbor, Michigan.

<sup>9</sup> Singer AJ, Hollander JE, Quinn JV. Evaluation and management of traumatic lacerations. *N Engl J Med* 1997; 337: 1142-8

<sup>10</sup> Cummings P, Del Beccaro MA. Antibiotics to prevent infection of simple wounds: a meta analysis of randomized studies. *Am J Emerg Med* 1995; 13: 396-400

<sup>11</sup> Zehtabchi S. Evidence-based emergency medicine/ critically appraised topic. The role of antibiotic prophylaxis for prevention of infection in patients with simple hand lacerations. *Ann Emerg Med* 2007; 49: 682-9, 689. 4. Cowell DL, Harvey M, Cave G. Antibiotic prophylaxis at triage for simple traumatic wounds: a pilot study. *Eur J Emerg Med* 2011; 18: 279-81.

<sup>12</sup> Cowell DL, Harvey M, Cave G. Antibiotic prophylaxis at triage for simple traumatic wounds: a pilot study. *Eur J Emerg Med* 2011; 18: 279-81.

<sup>13</sup> Rodgers KG. 1992. The rational use of antimicrobial agents in simple wounds. *Emerg Med Clin North Am*, 10, 753-756.

<sup>14</sup> Sacks T. 1988. Prophylactic antibiotics in traumatic wounds. *J Hosp Inf*, 11, (Suppl. A), 251-258.

<sup>15</sup> Berk WA, Welch RD and Bock BF. 1992. Controversial issues in clinical management of the simple wound. *Ann Emerg Med*, 21, 72-80.

<sup>16</sup> Trott AT. 1991. *Wounds and Lacerations: Emergency Care and Closure*. St. Louis, Mo, Mosby-Year Book.

<sup>17</sup> O.C.S. Cassell and I.Ion; Are antibiotics necessary in the surgical management of upper limb lacerations? British journal of Plastic Surgery..Trott AT. 1991. *Wounds and Lacerations: Emergency Care and Closure*. St. Louis, Mo, Mosby-Year Book.

<sup>18</sup> Cummings P and Del Beccaro MA. 1995. Antibiotics to prevent infection of simple wounds: a meta-analysis of randomized studies. *Am J Emerg Med*, 13, 396-400.

<sup>19</sup> Roberts A and Teddy P. 1977. A prospective trial of prophylactic antibiotics in hand lacerations. *Br J Surg*, 64, 394-396.

<sup>20</sup> Thirlby RC, Blair AJ and Thal ER. 1983. The value of prophylactic antibiotics for simple lacerations. *Surg Gynecol Obstet*, 156, 212-216.

<sup>21</sup> Stone S and Carter WA. 2004. Wound preparation, In: *Emergency Medicine a comprehensive study guide*. Tintinalli JE, Kelen GD and Stapczynski JS (eds.), New York, McGraw Hill, pp 289-291.

<sup>22</sup> Perelman VS, Francis GJ, Rutledge T, Foote J, Martino F and Dranitsaris G. 2004. Sterile Versus Nonsterile Gloves for Re-pair of Uncomplicated Lacerations in the Emergency Department: A Randomized Controlled Trial. *Ann Emerg Med*, 43, 362-370.

<sup>23</sup> Hoth JJ, Franklin GA, Stassen NA, Girard SM, Rodriguez RJ and Rodriguez JL. 2003. Prophylactic Antibiotics Adversely Affect Nosocomial Pneumonia in Trauma Patients. *J Trauma*, 55, 249-254.

<sup>24</sup> Terpstra S, Noordhoek GT, Voesten HG Hendriks B and Degener JE. 1999. Rapid emergence of resistant coagulase negative staphylococci in the skin after antibiotic prophylaxis. *J Hosp Infect*, 43, 195-202.

<sup>25</sup> Peacock K, Hanna D, Kirkpatrick K, Breidenbach W, Lister G, Firrell J. Efficacy of perioperative cefamandole with postoperative cephalexin in the primary outpatient treatment of open wounds of the hand. *J Hand Surg (Am)* 1988; 13: 9604.

<sup>26</sup> Ham-y B, Rodeheaver G, Vensko J, Edgerton MT, Edlich RF. Debridement: An essential component of traumatic wound care. *Am J Surg* 1978; 135: 23842.

<sup>27</sup> Prevention & management of wound infection; Department of violence & injury prevention & disability World Health Organization.





This page is intentionally left blank



GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM  
Volume 21 Issue 2 Version 1.0 Year 2021  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

# Association of Rs763780 Polymorphism of Gene IL17F with the Risk of Developing Rheumatoid Arthritis in Uzbekistan

By M. Sh. Karimov, A. A. Eshmurzaeva, Kh. M. Marufkhanov  
& M. V. Sibirkina

**Abstract-** As a result of the study conducted, it was witnessed that the G allele and the heterozygous A / G genotype of the IL17F gene (rs763780) among patients with RA are significantly higher than in the control group. In particular, the most significant discrepancies were registered in patients with articular-visceral form of the disease whom the G allele exceeded the proportion of carriage in the control statistically significantly 2.58 times ( $\chi^2 = 4.512$ ;  $P = 0.037$ ; OR = 2.58; 95% CI: 1.076 -6.188). On the part of the heterozygous genotype A / G there was a clear tendency to increase its frequency by more than twice ( $\chi^2 = 2.011$ ;  $P = 0.165$ ; OR = 2.068; 95% CI: 0.758-5.645) which in turn indicates the possible participation of the studied polymorphism in the pathogenesis of RA.

**Keywords:** rheumatoid arthritis (RA), rs763780 polymorphism of gene IL17F, carriage, allele, genotype, development risk.

**GJMR-H Classification:** NLMC Code: WE 346



*Strictly as per the compliance and regulations of:*





# Association of Rs763780 Polymorphism of Gene IL17F with the Risk of Developing Rheumatoid Arthritis in Uzbekistan

M. Sh. Karimov <sup>α</sup>, A. A. Eshmurzaeva <sup>σ</sup>, Kh. M. Marufkhanov <sup>ρ</sup> & M. V. Sibirskina <sup>ω</sup>

**Abstract-** As a result of the study conducted, it was witnessed that the G allele and the heterozygous A / G genotype of the IL17F gene (rs763780) among patients with RA are significantly higher than in the control group. In particular, the most significant discrepancies were registered in patients with articular-visceral form of the disease whom the G allele exceeded the proportion of carriage in the control statistically significantly 2.58 times ( $\chi^2 = 4.512$ ;  $P = 0.037$ ; OR = 2.58; 95% CI: 1.076 -6.188). On the part of the heterozygous genotype A / G there was a clear tendency to increase its frequency by more than twice ( $\chi^2 = 2.011$ ;  $P = 0.165$ ; OR = 2.068; 95% CI: 0.758-5.645) which in turn indicates the possible participation of the studied polymorphism in the pathogenesis of RA.

**Keywords:** rheumatoid arthritis (RA), rs763780 polymorphism of gene IL17F, carriage, allele, genotype, development risk.

## I. INTRODUCTION

Among all the variety of inflammatory diseases of joints, rheumatoid arthritis (RA) is amid the most prevalent nosology which affects about 1% of adult population worldwide [5,7]. Along with this, within diverse populations of the world, large epidemiological studies have established differences in the prevalence of the disease [6,7,14]. Hence, on a frequently basis, RA occurs in American Indians (up to 7%) while among other nationalities the incidence of the disease is in the range of 0.2–0.4% [14]. Pathogenic aspect of RA development remains poorly perceived. However, it is a fact that in the implementation of the pathological process that gives a rise to the disease, a connection is observed in conformity with a number of factors such as the impact of the environment, bad habits, microbial and viral agents, genetic polymorphisms, etc. [2,8,9,16]. Inflammation, being the basis for the development of

RA, come to light with transformations in the articular tissue. The progression of inflammation in the subsequent passes to the bone tissue inducing its destruction [3]. The bulk of factors are involved in the regulation of inflammatory processes among which the leading role is played by polymorphic variants of a number of pro-inflammatory cytokines (IL17F, etc.) [10,12]. Meanwhile, the results of studies on the assessment of participation in increasing the risk of developing RA are ambiguous [4,11,15,10,12,18]. Thus, researchers C. N. Carvalho (2015) did not find a correlation between the IL-17F (7488T / C) gene polymorphism and the development and severity of RA [4]. Similar results with no differences between the IL17F gene and the development of articular and extra-articular forms of the disease were obtained by A. Pawlik (2016) when investigating Polish patients with RA ( $n = 422$ ) [15]. S. Louahchi (2016) also did not find an association of IL17F (rs763780, rs2397084) with susceptibility to RA among Algerians ( $n = 343$ ) [15]. Nevertheless, the results of studies by Y. H. Lee, S.C. Bae, (2017), O. S. Marwa (2017), M. Shao (2020) confirm the role of the IL17F gene in the development of RA [10,12,18]. The resulting disagreements are possibly related to the traits of the studied populations. Corollary analysis of the studies performed delineates ambiguous conclusions regarding the contribution of the IL-17F gene to the mechanisms of RA onset. In this regard, it is of significant magnitude to conduct supplementary examinations to assess the relationship of this gene with the development of RA. Furthermore, the data obtained will assist to better conceive and explain the degree of participation of the IL-17F gene in the formation of this complex disease.

## II. MATERIAL AND METHODS

The study encompassed 106 adults (combined general group) of unrelated patients living in the Republic of Uzbekistan with a diagnosis of RA verified taking into account the ACR / EULAR criteria (2010) [1]. All patients, in the period of 2018 – 2021, were examined and hospitalized at 3 clinics of the Tashkent Medical Academy (Uzbekistan, Tashkent), which, depending on the form of the disease, were stratified into two subgroups 1A ( $n = 74$ ) - patients with articular RA and

**Author  $\alpha$ :** Doctor of Medical Sciences, Professor and Head of the Department of Internal Medicine Propedeutics, Tashkent Medical Academy, Tashkent, Uzbekistan. e-mail: [author.uzb@mail.ru](mailto:author.uzb@mail.ru)

**Author  $\sigma$ :** PhD, Assistant at the Department of Internal Medicine Propedeutics, Tashkent Medical Academy, Tashkent, Uzbekistan.

**Author  $\rho$ :** Doctor of Medical Sciences, Docent at the Department of Internal Medicine Propedeutics, Tashkent Medical Academy, Tashkent, Uzbekistan.

**Author  $\omega$ :** Candidate of Medical Sciences, Docent at the Department of Internal Medicine Propedeutics, Tashkent Medical Academy, Tashkent, Uzbekistan.

1B (n = 32) - patients with articular-visceral form of RA. When it comes to control, conditionally healthy individuals (n = 109) without a history of autoimmune diseases, comparable in sex, age and living in the territory of the re-public, were examined. In order to comply with ethical standards, informed consent was resulted from all individuals included in the study. For molecular genetic studies, DNA was isolated from venous blood leukocytes using the "AmpliPrime RIBO-prep, Russia" kit according to the standard method [13]. Detection of rs763780 polymorphism of the IL17F gene (SYNTOL, Russia) was carried out by SNP-PCR (Applied Biosystems, thermocycler 2720 (USA)) with verification of the specificity and number of amplified fragments by electrophoretic method in agarose gel. The obtained data were statistically processed using the "OpenEpi 2009, Version 9.3" software package.

### III. RESULTS AND DISCUSSION

The distribution of genotypes of the polymorphic variant of the IL-17F gene (rs763780) in the studied groups did not deviate from the Hardy-Weinberg equilibrium ( $P > 0.05$ ). In particular, genotypes A / A, A / G, and G / G in the combined group of RA patients were 0.79%, 0.2%, and 0.01% while in the control group their values amounted to 0.88%, 0.12%, and 0.0%, respectively. Analysis of allele distribution frequencies represented a greater registration of the proportion of carriers of the G allele among RA patients in the general group compared to controls (10.8% versus 6.0%). There was ascendance in the frequency of this indicator due to an increase in their share in both subgroups of patients which reached 9.5% in subgroup 1A of patients with articular RA and 14.1% in subgroup 1B of patients with articular-visceral RA (Table 1).

**Table 1:** Analysis of allelic distribution and genotypic frequencies of the IL 17F (rs763780) gene polymorphism in the studied groups

Group	n	Allele frequency				Genotype distribution frequency					
		A		G		A / A		A / G		G / G	
		n	%	n	%	n	%	n	%	n	%
First combined group of RA patients	106	189	89.2	23	10.8	84	79.3	21	19.8	1	0.9
Subgroup «1A»	74	134	90.5	14	9.5	60	81.1	14	18.9	0	0.0
Subgroup «1B»	32	55	85.9	9	14.1	24	75.0	7	21.9	1	3.1
Second control group	109	205	94.0	13	6.0	96	88.1	13	11.9	0	0.0

If the escalation in the proportion of allele G carriage of the polymorphic variant of the IL-17F gene (rs763780) in the 1st combined group of patients with RA and in the "1A" subgroup of patients with the articular form of the disease tended to amplify the risk of developing RA by almost twice ( $\chi^2 = 3.344$ ;  $P = 0.07$ ; OR = 1.919; 95% CI: 0.954-3.859) and 1.65 times ( $\chi^2 = 1.57$ ;  $P = 0.211$ ; OR = 1.65; 95% CI: 0.756-3.594). Then in the subgroup of patients "1B" with the articular-visceral form of RA, the risk of developing the disease was statistically significantly boosted by 2.58 times ( $\chi^2 = 4.512$ ;  $P = 0.037$ ; OR = 2.58; 95% CI: 1.076-6.188) (Table 2). Genotype A / A carriage proportion of the polymorphic variant of the IL-17F gene (rs763780) in all groups enabled particular differences: in the combined group of RA patients it was 79.3%, in subgroups "1A" and "1B" - 81.1% and 75.0%, respectively, and in the control group - 88.1%. Along with this, the frequency of the heterozygous genotype A / G had a clear discrepancy in the groups of patients (combined group RA - 19.8%; "1A" subgroup - 18.9%, "1B" - 21.9%) compared with the control (11.9%). In addition, it is important to note that the mutant G / G genotype was recorded only among patients with the articular-visceral form of the disease (subgroup 1B), the proportion of which was 3.1%. The decrease in the frequency of the wild A / A genotype among patients in contrast to the control did

not differ statistically (in the combined group of RA patients -  $\chi^2 = 3.073$ ;  $P = 0.084$ ; OR = 0.517; 95% CI: 0.247-1.081; in the "1A" subgroup -  $\chi^2 = 1.713$ ;  $P = 0.193$ ; OR = 0.58; 95% CI: 0.257-1.311 and in subgroup "1B" -  $\chi^2 = 3.336$ ;  $P = 0.072$ ; OR = 0.406; 95% CI: 0.154-1.068) (Table 2).

**Table 2:** Assessment of the relationship between IL17F gene polymorphism (rs763780) and the risk of developing rheumatoid arthritis

Groups under scrutiny	Alleles and genotypes	Statistical difference compared to control			
		OR	95% CI:	$\chi^2$	P
Group 1 RA (n=106) patients	A	3,344	0,072	0,521	0,259 - 1,048
	G	3,344	0,072	1,919	0,954 - 3,859
	A/A	3,073	0,084	0,517	0,247 - 1,081
	A/G	2,509	0,119	1,824	0,867 - 3,837
Subgroup 1A, RA (n=74) articular form	A	1,577	0,211	0,607	0,278 - 1,323
	G	1,577	0,211	1,648	0,756 - 3,594
	A/A	1,713	0,193	0,580	0,257 - 1,311
	A/G	1,713	0,193	1,723	0,763 - 3,892
Subgroup 1B, articular-visceral form of RA (n = 32)	A	4,512	0,037	0,388	0,162 - 0,929
	<b>G*</b>	<b>4,512</b>	<b>0,037</b>	<b>2,580</b>	<b>1,076 - 6,186</b>
	A/A	3,336	0,072	0,406	0,154 - 1,068
	A/G	2,011	0,165	2,068	0,758 - 5,645

Meanwhile, the differences in the proportion of the heterozygous genotype A / G carriage in the groups of RA patients compared with the controls turned out to be more paramount. So, if in the 1st combined group of RA patients this genotype boosted 1.8 times ( $\chi^2 = 2.509$ ;  $P = 0.119$ ;  $OR = 1.824$ ;  $95\% \text{ CI: } 0.867-3.837$ ); then in "1A" subgroup 1.72 times ( $\chi^2 = 1.713$ ;  $P = 0.193$ ;  $OR = 1.723$ ;  $95\% \text{ CI: } 0.763-3.892$ ) and in subgroup "1B" more than twice ( $\chi^2 = 2.011$ ;  $P = 0.165$ ;  $OR = 2.068$ ;  $95\% \text{ CI: } 0.758-5.645$ ). The obtained differences indicate the presence of a clear tendency towards an increased risk of RA formation in carriers of the A / G genotype. Perhaps, with a larger coverage of the sample under study, disparities could be reliably significant. Consequently, differences that we established in the frequency of distribution of the G allele and the A / G genotype among RA patients compared to controls allow us to determine their role in proliferating the risk of developing the disease, especially the articular-visceral form.

#### IV. CONCLUSION

Rheumatoid arthritis is induced by a complex autoimmune disease, the origin of which is complicated by the lack of pathological mechanisms [14]. However, the results of modern studies emphasize the special role of genetic polymorphisms of genes of proinflammatory cytokines which are involved not only in increasing the risk of developing RA, but also in the severity of its course [7]. IL17F is considered as one of these genes, which can serve as a potential candidate gene leading

to the development of RA [10, 12]. Meanwhile, in relation to this point of view, the views of researchers differ. So, if C. N. Carvalho (2015), S. Louahchi (2016), A. Pawlik (2016) [4, 11, 15] did not find an association between the IL17F gene and the onset of RA in their studies, the results of later works by Y. H. Lee, S.C. Bae, (2017), O. S. Marwa (2017), M. Shao (2020) indicate the participation of the IL17F gene in the mechanisms of RA formation [10, 12, 18]. Taking into account the existing disagreements in this regard, we found it interesting to assess the participation degree of the IL17F (rs763780) gene polymorphism in the risk of developing RA among the population of the Republic of Uzbekistan. As a result of our studies, we have encountered in that the G allele and the heterozygous A / G genotype of the IL17F gene (rs763780) among patients with RA are significantly higher than in the control group. In particular, the most significant differences were found in patients with articular-visceral form of the disease in which the G allele exceeded the proportion of carriage in the control statistically significantly 2.58 times ( $\chi^2 = 4.512$ ;  $P = 0.037$ ;  $OR = 2.58$ ;  $95\% \text{ CI: } 1.076-6.188$ ) and on the part of the heterozygous genotype A / G there was a clear tendency to increase its frequency by more than twice ( $\chi^2 = 2.011$ ;  $P = 0.165$ ;  $OR = 2.068$ ;  $95\% \text{ CI: } 0.758-5.645$ ) which in turn indicates the possible participation of this polymorphism in the pathogenesis of the disease. Moreover, only among patients with this form of RA was the carriage of the mutant genotype G / G (3.1%;  $\chi^2 = 2.011$ ;  $P = 0.165$ ;  $OR = 2.068$ ;  $95\% \text{ CI: } 0.758-5.645$ ). The obtained data emphasize the role of the polymorphic variant of the IL17F gene (rs763780) in the

development of RA among the population of Uzbekistan. In addition, these results contribute to a deeper understanding of the pathogenetic mechanisms of RA formation which is overly consequential in predicting the development of RA and searching for the most effective methods of treating the disease.

## REFERENCES RÉFÉRENCES REFERENCIAS

1. D. Aletaha., T. Neogi., A. J. Silman. Rheumatoid arthritis classification criteria: an American College of Rheumatology/European League against Rheumatism collaborative initiative. *Ann Rheum Dis* 2010, 69: 1580—8; (2020).
2. R. J. Ball., A. Avenell., L. Aucott. *Arthritis*, 17 (2015)
3. M. C. Boissier., L. Semerano., S. Challal., N. Saidenberg-Kermanach., G. Falgarone. *Autoimmun*, 39 (2012) doi:10.1016/j.jaut.2012.05.021.
4. C. N. Carvalho., R. F. Carmo., E. Duarte, A. Carvalho., J. Leão., C. Gueiros. *Clinical Oral Investigations*, 20 (2015) doi: 10.1007/s00784-015-1540-2.
5. A. P. Cribbs., A. Kennedy., H. Penn., P. Amjadi., P. Green., J. *Arthritis Rheumatol*, 67 (2015) doi: 10.1002/art.39031.
6. M. Cross., E. Smith., D. Hoy., L. Carmona., F. *Annual Rheumatology*, 37 (2014) doi: 10.1136/annrheumdis-2013-204627.
7. G. S. Firestein. Pathogenesis of rheumatoid arthritis: the intersection of genetics and epigenetics. *Trans Am Clin Climatol Assoc.* 2018; 129: 171-182. PMID: PMC6116585.
8. A. K. Hedström., L. Stawiarz., L. Klareskog. *Swedish Medicine*, 45 (2018) <https://doi.org/10.1007/s10654-018-0360-5>.
9. N. Kharlamova., X. Jiang., N. Sherina., B. Potempa., L. Israelsson., A. Quirke. *Arthritis & Rheumatology*, 68 (2013) doi: 10.1002/art.39491.
10. Y. Lee., H. Bae. *Postgraduate Medical Journal*, 93 (2017) doi: 10.1136/postgradmedj-2016-134637.
11. S. Louahchi., I. Allam., L. Berkani., A. Boucharer., A. Abdesamed., N. Khaldoun. *Acta Reumatologica Portuguesa*, 41 (2016)
12. O. S. Marwa., T. Kalthoum., K. Wajih., H. Kamel. *Immunology Letters*, 183 (2017) doi: 10.1016/j.imlet.2017.01.013.
13. S. A. Miller., D. D. Dykes., Polesky H.F. *Nuclear Acids Research*, 15 (1988).
14. M. A. Nemtsova, M. V., Zaletaev, D. V., Bure, I. V., Mikhaylenko, D. S., Kuznetsova, E. B., Alekseeva, A. Zamyatnin. (2019). Epigenetic Changes in the Pathogenesis of Rheumatoid Arthritis. *Frontiers in Genetics*, 10. doi: 10.3389/fgene.2019.00570.
15. A. Pawlik., D. Kotrych., D. Malinowski., V. Dziedziejko., M. Czerewaty., K. Safranow. (2016). IL17A and IL17F gene polymorphisms in patients with rheumatoid arthritis. *BMC Musculoskeletal Disorders*, 17 (1), 208.
16. J. Potempa, J., Mydel, P., & Koziel, J. (2017). The case for periodontitis in the pathogenesis of rheumatoid arthritis. *Nature Reviews Rheumatology*, 13(10), 606–620. doi: 10.1038/nrrheum.2017.
17. H. U. Scherer., T. Häupl., G. Burmester. *Journal of Autoimmunity*, 10 (2019) doi: 10.1016/j.jaut.2019.102400.
18. M. Shao., S. Xu., H. Yang., W. Xu., J. Deng., Y. Chen., F. Pan. *Clinical Immunology*, 10 (2020) doi: 10.1016/j.clim.2020.108374



GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM  
Volume 21 Issue 2 Version 1.0 Year 2021  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

# The Outcome of Surgical Management for Unstable Fracture of the Distal Radius by Volar Locking Plating System

By Dr. Abdur Rahman, Dr. A. K. M. Harun-Ar-Rashid, Dr A.T. M. Rezaul Karim,  
Dr. Mohammad Shaha Alam, Dr. Ayesha Begum, Dr. Salma Akhter  
& A. H. M. Azgar Ali Chowdhury

*Chittagong Medical College*

**Abstract- Objective:** In this study our main goal is to evaluate the outcome of surgical management for unstable fracture of the distal radius by volar locking plating system.

**Method:** This observational prospective study was carried out at Chittagong Medical College Hospital and private hospitals in Chittagong from May 2015 to November 2020. Where a total of 30 Patients with unstable distal radial fracture attending at the emergency and outpatient department of Chittagong Medical College Hospital and Private Hospitals in Chittagong were included in this study.

**Results:** During the study, most of cases were left side were affected, 56.7% and 3.3% had fracture SOF. 73.3% patients stayed in hospital for 3-4 days followed by 16.7% had stayed in hospital 5-6 days, 10% had stayed in hospital 7-8 days. 23.3% cases were excellent followed by 60% cases were good, 10% cases were fair, 6.7% cases were poor.

**Keywords:** unstable fracture of the distal radius, volar locking plating system, distal fracture femur.

**GJMR-H Classification:** NLMC Code: WE 168, WE 185



*Strictly as per the compliance and regulations of:*



© 2021. Dr. Abdur Rahman, Dr. A. K. M. Harun-Ar-Rashid, Dr A.T. M. Rezaul Karim, Dr. Mohammad Shaha Alam, Dr. Ayesha Begum, Dr. Salma Akhter & A. H. M. Azgar Ali Chowdhury. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at <https://creativecommons.org/licenses/by-nc-nd/4.0/>.



# The Outcome of Surgical Management for Unstable Fracture of the Distal Radius by Volar Locking Plating System

Dr. Abdur Rahman <sup>α</sup>, Dr. A. K. M. Harun-Ar-Rashid <sup>σ</sup>, Dr. A.T. M. Rezaul Karim <sup>ρ</sup>,  
Dr. Mohammad Shaha Alam <sup>ω</sup>, Dr. Ayesha Begum <sup>¥</sup>, Dr. Salma Akhter <sup>§</sup>  
& A. H. M. Azgar Ali Chowdhury <sup>x</sup>

**Abstract- Objective:** In this study our main goal is to evaluate the outcome of surgical management for unstable fracture of the distal radius by volar locking plating system.

**Method:** This observational prospective study was carried out at Chittagong Medical College Hospital and private hospitals in Chittagong from May 2015 to November 2020. Where a total of 30 Patients with unstable distal radial fracture attending at the emergency and outpatient department of Chittagong Medical College Hospital and Private Hospitals in Chittagong were included in this study.

**Results:** During the study, most of cases were left side were affected, 56.7% and 3.3% had fracture SOF. 73.3% patients stayed in hospital for 3-4 days followed by 16.7% had stayed in hospital 5-6 days, 10% had stayed in hospital 7-8 days. 23.3% cases were excellent followed by 60% cases were good, 10% cases were fair, 6.7% cases were poor. After surgery 13.3% patients had wrist stiffness followed by 10% had persistent wrist pain and reduced grip strength, 3.3% had surgical site infection and late collapse.

**Conclusion:** Management of distal radius fracture for adult patients with volar locking plating system results in satisfactory outcomes in most of the cases with minimum complications.

**Keywords:** unstable fracture of the distal radius, volar locking plating system, distal fracture femur.

## I. INTRODUCTION

Fractures of the distal radius are the most common fractures accounting about one sixth of the total skeletal injuries<sup>1</sup>. As high as 40% to 49% are considered to be unstable that requires surgical fixation.<sup>2</sup>

**Corresponding Author α:** Assistant Prof. of Orthopedic Surgery, Chittagong Medical College, Chattogram, Bangladesh.  
e-mail: sarwartopbright2019@gmail.com

**Author σ:** Assistant Prof. of Orthopedic Surgery, Cox's Bazar Medical College, Cox's Bazar, Bangladesh.

**Author ρ:** Consultant of Orthopedic Surgery, Parkview Hospital, Chittagong, Bangladesh.

**Author ω:** Assistant. Prof. of Surgery, Chittagong Medical College, Chittagong, Bangladesh.

**Author ¥:** Assistant Prof. of Pediatrics, Chittagong Medical College, Chittagong, Bangladesh.

**Author §:** Assistant professor, Department of Obstetrics and Gynaecology. Chittagong Maa O Shishu Medical College.

**Author x:** Junior Consultant of Orthopedic Surgery, Chittagong Medical College Hospital, Chattogram, Bangladesh.

Most functional tool for the physical activity of human being is "the hand". Improper treatment of unstable distal radial fracture, may compromise hand function.<sup>3</sup>

Management of the distal radius fractures are dictated by the pattern of the fractures, degree of displacement of the bone fragments, involvement of the fracture with the joints, associated soft tissue injuries, and the patients pre- injury activity level and physical demands.<sup>4</sup>

Unstable distal radius fracture requires surgical fixation of the broken bone because closed reduction (non-surgical manipulation and casting) often is insufficient to maintain fracture reduction and promote bone healing. Operative management of the distal radius fracture has been studied extensively and has evolved over past decade. The best treatment of unstable distal radial fracture is not well established. So, the treatment of unstable distal radial fractures continues to improve as better method of fixation and soft tissue management are more to be developed.<sup>5</sup>

With the locking system, distal screws are locked to the plate, which stabilizes the screws against lateral movement (toggle effect). This provides augmentation to the strength of fixation by producing "single bone-plate-screws construct" which producing a scaffold in the mostly cancellous distal radial metaphysis & also under distal radial articular surface.

This new technique of fixation is now sporadically being practiced in Bangladesh: For "A good Functional hand", the use of "Volar locking plating system" may be considered as a better tool in the treatment for unstable distal radial fractures in our country.

## II. OBJECTIVE

- To evaluate the outcome of surgical management for unstable fracture of the distal radius by volar locking plating system.

## III. METHODOLOGY

**Type of study:** This is an observational prospective clinical study.

**Place and period of study:** This study was conducted at Chittagong Medical College Hospital and private hospitals in Chittagong from May 2015 to November 2020.

**Study population:** Patients with unstable distal radial fracture attending at the emergency and outpatient department of Chittagong Medical College Hospital and Private Hospitals in Chittagong.

**Inclusion criteria**

- Unstable fracture of distal radius.
- Closed or open with soft tissue injury (Gustillo I & II)
- Age-any adult patient.(18-70 years)

**Exclusion criteria**

- Open fracture (Gustillo type III)
- Stable fracture.

- Undisplaced fracture.
- Acute medical illness.
- Poly trauma patient.
- Patients with mental or psychic issues.

**Sample selection**

A total of 30 Patient attended at Emergency Department and OutpatientDepartment of Chittagong Medical College hospital & PrivateHospital in Chittagong were selected considering the inclusion criteria.

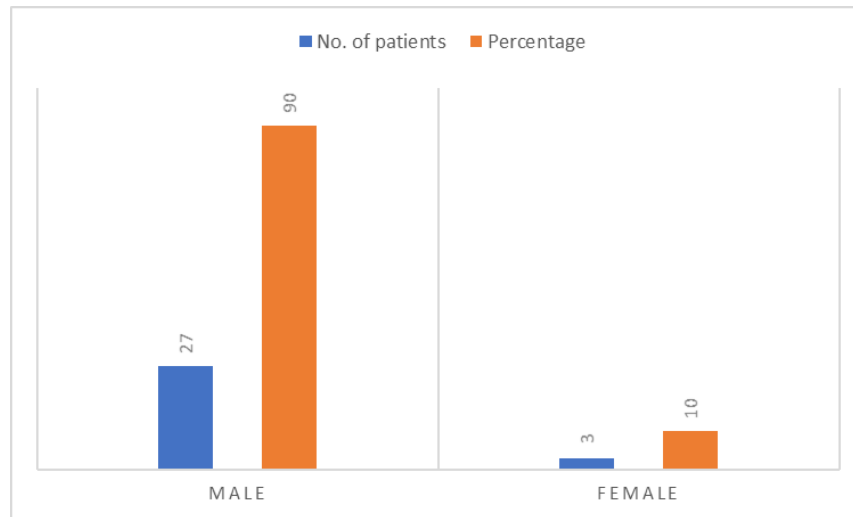
## IV. RESULTS

In table-1 shows age distribution of the patients where most of the patients belong to 31-45 years age group, 56.7%. The following table is given below in detail:

**Table – 1:** Distribution of patients in different age group

Age group	No. of patients	Percentage
18-30	9	30
31-45	17	56.7
46-70	4	13.3
Total	30	100

In figure-1 shows gender distribution of the patients where 90% patients were male and 10% patients were female. The following figure is given below in detail:



**Figure-1:** Gender distribution of the patients.

In table-2 shows distribution of the patients according to side affected where most of cases were left side were affected, 56.7%. The following table is given below in detail:

**Table-2:** Distribution of sides affected

Side Affected	No. of patients	Percentage
Right	13	43.3
Left	17	56.7
Total	30	100

In table-3 shows time intervals between injury and management of the patients where most of the cases were treated between 1-3 days of interval. The following table is given below in detail:

*Table-3:* Time intervals between injury and management

Time Interval	No. of Patients	Percentage
1-3	11	36.7
4-7	08	26.7
8-14	09	30.0
14-20	02	6.6
Total	30	100

In table-4 shows distribution of associated injuries where 3.3% had fracture SOF. The following table is given below in detail:

*Table-4:* Distribution of associated injuries

Associated injuries	No. of patients	Percentage
Fracture SOF	1	3.3
Fracture trochanter of femur	0	0
Fracture NOF	0	0
Chest Injury	0	0

In table-5 shows duration of hospital stay where 73.3% patients stayed in hospital for 3-4 days followed by 16.7% had stayed in hospital 5-6 days, 10% had stayed in hospital 7-8 days. The following table is given below in detail:

*Table – 5:* Duration of hospital stay from admission and discharge

Hospital stay (day)	No. of patients	Percentage
1-2	0	0.0
3-4	22	73.3
5-6	05	16.7
7-8	03	10.0
Total	30	100

In table-6 shows Distribution of outcome of physiotherapy. 23.3% cases were excellent followed by 60% cases were good, 10% cases were fair, 6.7% cases were poor. The following table is given below in detail:

*Table – 6:* Distribution of outcome of physiotherapy

Result	No. of Patients	Percentage
Excellent	7	23.3
Good	18	60.0
Fair	3	10.0
Poor	2	6.7
Total	30	100

In table-7 shows distribution of incidence of complications where 13.3% patients had wrist stiffness followed by 10% had persistent wrist pain and reduced grip strength, 3.3% had surgical site infection and late collapse. The following table is given below in detail:

*Table -7:* Distribution of incidence of complications

Complications	No. of Patients (total=15)	Percentage
Persistent wrist pain	3	10.0
Wrist stiffness	4	13.3
Finger stiffness	0	0.0
Reduced grip strength	3	10.0
Reduced pinch power	0	0.0
Surgical site infection	1	3.3
Late collapse	1	3.3

## V. DISCUSSION

There were some complications in this study. Two case developed tourniquet palsy in immediate postoperative period but fully improved within few days. Once case had feature of late collapse though fixed properly earlier. Wrist stiffness was in 4 cases which improved but not significantly after physiotherapy. Persistent wrist pain developed in one case. Step off > 2mm seen in one case.

Correction and maintenance of anatomical landmark (radial length, radial angle, and dorsal angle) are the most important factors to regain hand and wrist function. Anatomical and functional outcome in this was good to excellent in most of the cases.

The volar locking plating system as a method of fixing distal radius fracture has been shown one of the effective methods in relation with anatomical and functional outcome of the wrist joint. An advantage of the volar plating technique is the comfort that it provides to patients in initiating early finger and wrist motion.<sup>6</sup>

The locking screws in the volar locking plating system offer an additional advantage over previous implants.<sup>7</sup> With previous volar plate designs involving non-locking screws, screw purchase in the metaphysis of the distal part of the radius often was poor because of the limited amount of cortical bone in this location. With the new design, the distal screws are locked to the plate, which stabilizes the screws against lateral movement (toggle) and resists loosening.<sup>4</sup> This provides additional strength to the fixation by constructing a scaffold under the distal radial articular surface and producing 'bone-plate-screws construct'.<sup>8</sup>

Plate-related complications did not occur in this series. The pronator quadratus provided muscular coverage of the plate and shielded the flexor tendons from the plating system.

In this study average follow-up period was 6 months. The mean Gartland and Werley score improves significantly from 4 points at 6 months to 2 points at two years.<sup>9</sup>

Male attended more for 'Volar Locking Plating System' expecting good functional hand for the cost of procedure.

## VI. CONCLUSION

Management of distal radius fracture for adult patients with volar locking plating system results in satisfactory outcomes in most of the cases with minimum complications.

## REFERENCES RÉFÉRENCES REFERENCIAS

1. Coony WP, linscheild RL and Dobyns JH. External pin fixation for unstable colles' fractures'. JBJS 1953, vol 35: 641-648.
2. Willis AA, Mutsumi K, Zobitz K, Coony WP. Internal fixation for dorsally displaced of the distal part of the radius. JBJS 2006, vol 88A, no-12; 2411-17.
3. Andrew H, Crenshaw J.' Fracture of shoulder girdle, arm and forearm In Campbell's Operative Orthopaedic surgery, edited by terrycanle, Memphis, Tennessee 9th ed; 2281-362.
4. Scot ML, Cory ON, Jonathan DB, Glen AT, Yong K, fredSH., 'Biomechanical evaluation of volar locking plate for distal radius' Hand 2008, March, 3(1); 57-60.
5. Willis AA, Matsumi K, Zobitz K, Coony WP. 'Internal fixation of dorsally displaced fractures of the distal part of the radius. 'JBJS 2006, vol 88A, no-12; 2411-17.
6. Rikli DA, Regazzoni. Fractures of the distal end of the radius treated by internal fixation and early function. J Bone Jt Surg Br 1996; 78: 588-92.
7. Ring D, Jupiter JB, Brennwald J, Buchler U, Hastings H II. Prospective multicenter trial of a plate for dorsal fixation of distal radius fractures. J Hand Surg 1997; 22A: 777-84.
8. Trease C, McIlff T, Toby EB. Locking versus nonlocking T-plates for dorsal and volar fixation of dorsally comminuted distal radius fractures: a biomechanical study. J Hand Surg 2005; 30: 756-63.
9. Egol KA, Kubiak EN, Fulkerson E, Kummer FJ, Koval KJ. Biomechanics of locked plates and screws. J Orthop Trauma 2004; 18: 488-93.



GLOBAL JOURNAL OF MEDICAL RESEARCH: H  
ORTHOPEDIC AND MUSCULOSKELETAL SYSTEM  
Volume 21 Issue 2 Version 1.0 Year 2021  
Type: Double Blind Peer Reviewed International Research Journal  
Publisher: Global Journals Inc. (USA)  
Online ISSN: 2249-4618 & Print ISSN: 0975-5888  
Received Date: 24<sup>th</sup> March 2021, Acceptance Date: 2<sup>nd</sup> April 2021

# Managing Orthopaedic Injuries in Covid-19 Pandemic: A Consise Review

By Dr. Sagar Chaudhari, Dr. Ajit Govind Jangale,  
Dr. Sheetal Ajit Jangale & Dr. Sharayu Dhande

**Abstract-** Conservative, non-operative therapeutic approach may provide an alternative in non-obligatory fractures in the current COVID-19 pandemic and perhaps later on as well. It may serve as a route for us to manage orthopaedic injuries till we tide over the peak of the pandemic and resume elective surgeries. Perhaps, the Coronavirus crises has given us this unique opportunity to rethink and revisit traditional methods of treating fractures and the tolerance to operate every limb fracture must be risen. We must realize that all the fractures do not always need operative management and the conservative management still has a certain place in our armamentarium of fracture management, in an evolving world.

**Keywords:** orthopaedic injuries, trauma, COVID-19, non-operative management, fracture, dislocation, road traffic accidents, fragility fractures, paediatric injuries.

**GJMR-H Classification:** NLMC Code: WE 168



*Strictly as per the compliance and regulations of:*





# Managing Orthopaedic Injuries in Covid-19 Pandemic: A Consise Review

## Covid - 19 and Orthopaedic Injuries

Dr. Sagar Chaudhari <sup>α</sup>, Dr. Ajit Govind Jangale <sup>σ</sup>, Dr. Sheetal Ajit Jangale <sup>ρ</sup> & Dr. Sharayu Dhande <sup>ω</sup>

**Abstract-** Conservative, non-operative therapeutic approach may provide an alternative in non-obligatory fractures in the current COVID-19 pandemic and perhaps later on as well. It may serve as a route for us to manage orthopaedic injuries till we tide over the peak of the pandemic and resume elective surgeries. Perhaps, the Coronavirus crises has given us this unique opportunity to rethink and revisit traditional methods of treating fractures and the tolerance to operate every limb fracture must be risen. We must realize that all the fractures do not always need operative management and the conservative management still has a certain place in our armamentarium of fracture management, in an evolving world.

**Keywords:** orthopaedic injuries, trauma, COVID-19, non-operative management, fracture, dislocation, road traffic accidents, fragility fractures, paediatric injuries.

### 1. INTRODUCTION

Coronavirus disease (COVID-19) is a novel severe acute respiratory syndrome.<sup>1,2</sup> The virus was first isolated from three people with pneumonia connected to the cluster of cases in Wuhan. It was first identified in December 2019 in Wuhan, China and has spread to the rest of the world creating a global pandemic.<sup>3-8</sup>

Extensive measures have been taken by different countries, in order to reduce person-to-person transmission of COVID-19 in a variety of ways, in which the social distancing, lockdowns, curfew and self-isolation remaining common across the whole world.<sup>9-13</sup>

Hence, the rate of Road Traffic Accidents (RTA's) are drastically declined due to extensive lockdown, but the rate of fragility fractures continues to be unaffected, due to more prevalent osteopenia and osteoporosis with progressive ageing. The fragility fractures and traumatic fractures require robust intensive care.<sup>11,13-16</sup>

Few other injuries include – falling from standing height, fall from less than 1m height like from stool, chair

or bed, fall from a bicycle or a bike, fall from a height more than 1m height like roof of the house, tree etc, high energy fracture from high height, road traffic accidents.<sup>17</sup>

These accidental injuries not only increase the susceptibility of COVID-19 transmission but also aid in consumption of medical resources that have declined during the SARS-CoV-2 caused pandemic via the way of transmission through hospital.<sup>18</sup>

Simplifying the management of injuries with the use of braces and boots rather than a plaster casts along with consideration for uncemented implants and un-reamed nails, have resulted in potential advantage in decreasing the respiratory complications in patients who were infected with COVID-19. Such treatments help reduce number of visits to the hospital and also exposure to ultra-dense waiting rooms which could be a breeding ground for SARS-CoV-2.<sup>19-21</sup>

Few patients with lower limb fracture have been more susceptible to pulmonary infections with limited ambulatory capacity.<sup>22,23</sup>

The COVID-19 pandemic exposed orthopaedic surgeons to manage traumatic injuries with limited resources and in safe manner whilst guarding all other healthcare professionals.<sup>24-30</sup>

According to Fineberg 2020, the patients who have to be treated should be categorized based on the COVID-19 exposure -<sup>31</sup>

- 1) A patient who is not known to be exposed or infected at any time
- 2) A patient who was exposed but is currently asymptomatic
- 3) A patient who has recovered from COVID and could be adequately immune
- 4) A patient who is possibly infected (persons with sign and symptoms consistent with infection who initially test negative)
- 5) A patient who is currently infected

**Corresponding Author α:** M.B.B.S, D.Orthopaedics, Consulting Orthopaedic Surgeon. e-mail: Drsagarchaudhari@Yahoo.Com

**Author σ:** Ms Orthopaedics, Mrcs, Assistant Professor, Dr Vasant Rao Pawar Medical College, Nashik. e-mail: Ajitjangale86@Gmail.Com

**Author ρ:** Bds, Mds, Pedodontist and Preventive Dentist, Private Practitioner. e-mail: Sheetalchaudhari25@Gmail.Com

**Author ω:** Bds, Mds Pg Student (Final Year), Department of Periodontology and Oral Implantology, M A Rangoonwala College of Dental Sciences and Research Centre, Pune. e-mail: Dhandesham1234@Gmail.Com

On the basis of urgency of surgical procedures patients are categorized as:<sup>32</sup>

Category type	Procedures should occur within
1a	24 hours
1b	72 hours
2	1month
3	3month
4	>3months

### *Steps in Managing a Trauma Patient with Covid-19 Symptoms or History of Contact*

An Orthopaedic surgeon has to be vigilant at all times during providing pre-operative, intra-operative as well as post-operative care to refrain cross-infection amongst surgeons as well as other healthcare professionals.<sup>33</sup> Thermal screening for both the patient as well their attendee should be carried out, appropriate travel history, history of any previous contact should be undertaken. A three-layer surgical mask, hand sanitizer and a pair of disposable gloves should be provided at the entry point to patients along with their attendants who require emergency care.<sup>34-36</sup> The door handles, chair handles, tables and other necessary material in the waiting areas should be regularly cleaned with 1% sodium hypochlorite atleast 4 times a day.<sup>37-40</sup>

A separate specialized area should be kept ready in the triage to treat COVID patients with trauma. The respective CMO's and the SMO's in the hospital should be informed immediately, in case a symptomatic patient is encountered.

Each orthopaedic surgeon along with attendants, are advised to donned PPE kits before examining every single patient, which later on should be carefully doffed off after use.<sup>41-45</sup>

Resuscitate the patient and rule out all the injuries, also ask the patient to fill Informed consent, along with splintage of fracture limb.<sup>33</sup>

All the necessary pre-operative investigations along with COVID-19 testing are advised.

If possible, the portable X-rays and ultrasound should be shifted to consulting room to avoid contamination of the radiology area and it also helps in decreasing movement of symptomatic patients.<sup>35</sup>

For investigations like CT scan or MRI, we have to sterilize the respective area after investigating every patient as per centres for disease control and prevention guidelines.<sup>35</sup>

Patients with closed fractures are advised to wait for surgical interventions until the COVID-19 results are out.

All cases that need urgent management like an open fracture, vascular injuries, compartment syndrome or mangled limb; and cannot wait until COVID reports. These patients should be treated as COVID positive patients unless proven otherwise and strict precautions should be taken while treating them so as to avoid transmission to healthcare professionals or to other patients.<sup>33-35</sup>

If the reports are positive keep the patient in the COVID isolation ward until the results are negative and take the help of the COVID response team of the hospital. If the results are negative shift the patient to the orthopaedic ward and then discharge as early as possible.<sup>33-35</sup>

Care must be taken during the hospital stay to physiotherapy, bedsores and DVT prevention.

## II. EMERGENCY TRIAGE

Patients presented to the emergency triage with an orthopaedic emergency such as joint dislocations, compartment syndrome, open fractures, mangled extremity, polytrauma with Full Endoscopic Spine Surgery (FESS) should be managed according to a specific guidelines during global health emergencies like a pandemic of COVID-19.<sup>46-49</sup>

These orthopaedic emergencies require effective outpatient, inpatient and surgical care besides avoiding transmission of infection to fellow patients and health care givers.

The injuries that cannot be managed by the non-operative approach, should be corrected immediately with the surgical approach, with minimum usage or if possible by, completely avoiding Aerosol-Generating Procedures and with proper usage of Personal Protective Equipments with minimum assistants in the operatory.<sup>20,50-53</sup>

Patient Triaging Guidelines for Orthopaedic Surgeries:<sup>54</sup>

Orthopaedic Subspecialty	Operative Management		Non-Operative Management Indications
	Absolute Indications	Relative Indications	
Trauma & General Orthopaedics	Open Fractures Polytrauma Trauma With Neurovascular Injuries Irreducible Fracture Dislocations Compartment Syndrome Crush Injuries Septic Arthritis Acute Osteomyelitis Amputations For Gangrene	Femur Fractures (Shaft/Neck/Distal Femur) • Unstable Pelvic/ Acetabular Fractures • Intraarticular/ Forearm Fractures • Unstable Tibial Shaft Fractures • Communitied/Complex Fractures • Unstable Upper Limb Fractures • Diabetic Foot	Stable Tibial Shaft Fractures • Clavicle Fractures • Stable Upper Limb Fractures • Non Unions • Malunions • Infected Non Unions • Chronic Osteomyelitis
Hand	Crush Hand • Replantation Surgeries • Infections	Tendon Injuries • Communitied/ Unstable Fractures • Fracture -Dislocation • Irreducible Dislocations	Compressive Neuropathies • Tendinitis • Stable Fractures
Spine	Cauda Equina Syndrome • Epidural Abscess • Discitis Pyogenic • Spine Fracture Unstable With Paraplegia • Acute/Progressive Compressive Myelopathy	Unstable Spine Fracture With Neural Deficit • Scoliosis With Neural Deficit • Acute Radiculopathy	Low Back Pain • Neck Pain • Flat Back Syndrome • Scoliosis Without Neural Deficit • Spine Fracture Stable
Arthroplasty	Prosthetic Joint Infections • Prosthetic Joint Dislocations • Periprosthetic Fractures		Chronic Hip/Knee Pains
Orthopaedic Oncology	Infection Including Infected Joints	Sarcoma/Malignancy In Chemo/Radiation Window • Benign Aggressive Tumours Like Gct • Impending Pathological Fractures	Benign Soft Tissue Tumors • Benign Bone Tumours
Sports	Multiligamentous Injuries With Neurovascular Deficit	Multiligamentous Injury • Rotator Cuff Repairs (Young) • Major Muscle Tear	Chronic Knee, Elbow, Shoulder, Wrist, Hip Pains • Recurrent Sprains/ Dislocations • Acl/Pcl Tear

The Expert group from the Chinese Orthopaedic Association and Chinese Association of Orthopaedic Surgeons formulated an expert consensus on the diagnosis and treatment of orthopaedic emergency surgery during the outbreak of COVID-19, which has been published within the Chinese Journal of Orthopaedic Trauma in Chinese.<sup>55</sup>

The expert consensus categorized the orthopaedic patients into four types:<sup>55</sup>

*Type I-* Patients had not travelled within the in the epidemic area within 14 days and had no history of

direct or indirect contact with suspected or confirmed cases.

*Type II-* Patients had a history of direct or indirect contact with people from the epidemic area within 14 days, or patients board same neighbourhoods with suspected or confirmed cases. However, the patients had no clinical symptoms and every examinations were negative.

*Type III-* Patients are diagnosed as a suspected case of COVID-19.

Type IV- Patients were diagnosed as a confirmed case.

On the advent of COVID-19 pandemic, it has been acknowledged by the British Orthopaedic Association (BOA) emergency COVID-19 and the

National Health Service England (NHSE) guidelines to manage urgent orthopaedic and trauma conditions pragmatically balancing optimum treatment of patients against clinical safety with resource utilization.<sup>56,57</sup>

Non-Operative Management of Paediatric Fractures and Dislocations during Coronavirus Crises:<sup>56,57</sup>

Limb injuries in children and adolescents	Preferred Indications	Equivocal Indications	Contraindications
Hand Limb Trauma	Clavicle Fractures Proximal humerus fractures Shaft-humerus fractures with angulation of less than 45° Supracondylar fractures (Undisplaced/ minimally displaced) Extra-articular distal radius fracture Hand Fractures Reducible dislocations	Displaced Fractures. Eg. Supracondylar humerus, lateral condyle humerus Dislocations Fracture-dislocation	Unreduced dislocations Fractures with vascular deficits Compound Fractures Crush Injuries Compartment Syndrome
Lower Limb Trauma	Shaft-femur fractures with acceptable angulation and displacements Fractures around Knee Shaft-tibial fractures Phalanx Fractures Metatarsal Fractures Calcaneus Fractures Reducible dislocations	Fracture – dislocations Dislocations Displaced Fractures. Eg. Neck of Femur, Shaft Femur, Fractures around the ankle	Unreduced dislocations Fractures with neurovascular deficits Compound Fractures Crush Injuries Compartment Syndrome
Pelvic Acetabular Trauma	Stable/ Minimally displaced fractures	Open book type of injuries Unstable fractures	Compound Fractures

Non-Operative Management of Fractures and Dislocations in Adults during Coronavirus Crises:<sup>56,57,58</sup>

Limb and Spinal Injuries in Adults	Preferred Indications	Equivocal Indications	Contraindications
Upper limb	Clavicle fractures AC joint dislocations Scapula fractures Fractures without gross displacements; eg; proximal humerus, humeral shaft, humeral-supracondylar Extra-articular distal radius fractures Scaphoid Fractures Metacarpal Fractures Phalanx Fractures Reducible Dislocations	Fractures with significant displacement; Eg., Proximal humerus, humeral shaft, intercondylar humerus, olecranon Radius and Ulna shaft fractures Pathological Fractures Peri-prosthetic Fractures	Severe compound fractures Severe Crush Injuries Fractures involving vascular injuries Irreducible dislocations Grossly comminuted and displaced intra-articular fractures Compartment syndrome
Spine	Stable fractures	Unstable spine Fractures with neural deficit	Stable Spine Fractures Fractures with Progressive/ acute neurologic deficit
Lower Limb	Pubic rami fractures Undisplaced pelvis-acetabular Fractures Undisplaced Fractures around knee Calcaneus Fractures without gross displacement	Pelvic – acetabular Fractures with significant displacement Inter-trochanteric Fractures Intercondylar Fractures Tibial-shaft Fractures Tibial-Condyle Fractures	Fracture of neck of Femur Femur Shaft Fractures Severe Compound Fractures Severe Crush Injuries Fractures with vascular injuries Compartment syndrome Grossly comminuted and

	Metatarsal Fractures Phalanx Fractures	Patella Fractures Talar Fractures Calcaneous Fractures with gross displacement Lis Franc Injuries Peri-prosthetic Fractures Pathological Fractures	displaced intra-articular fractures Irreducible dislocations
--	---	--	--

### III. CONCLUSION

The COVID-19 pandemic has substantially led to decrease in operative management of trauma, in order to optimize medical resource allocation and also to help prevent the spread of COVID. The coronavirus crises has led to depletion in the surgical volume, and preference of non-operative management of trauma over operative. On the contrary, orthopaedic surgeons must remain vigilant all the time and be prepared to provide optimal care to the injured patients.

*Conflict of Interest:* None

*Author Contribution:* All authors have equally contributed for completion of this manuscript.

### REFERENCES RÉFÉRENCES REFERENCIAS

- Di Gennaro F, Pizzol D, Marotta C, Antunes M, Racalbutto V, Veronese N, Smith L. Coronavirus diseases (COVID-19) current status and future perspectives: a narrative review. *International journal of environmental research and public health*. 2020 Jan; 17(8): 2690.
- Kumar D, Malviya R, Sharma PK. Corona virus: a review of COVID-19. *EJMO*. 2020; 4(1): 8-25.
- Perlman S, Netland J. Coronaviruses post-SARS: update on replication and pathogenesis. *Nature reviews microbiology*. 2009 Jun; 7(6): 439-50.
- World Health Organization Director-General's Opening Remarks at the Media Briefing on COVID-19–11 March 2020. Available online: <https://www.who.int/dg/speeches/detail/who-director-general-s-openingremarks-at-the-media-briefing-on-COVID---11-march-2020>
- Hsu LY, Chia PY, Lim JF. The Novel Coronavirus (SARS-CoV-2) Pandemic. *Annals Academy of Medicine Singapore*. 2020 Mar 16; 49(105): 105-7.
- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*. 2020 Feb 15; 395(10223): 497-506.
- Lu H, Stratton CW, Tang YW. Outbreak of pneumonia of unknown etiology in Wuhan, China: the mystery and the miracle. *Journal of medical virology*. 2020 Apr; 92(4): 401-2.
- Yin Y, Wunderink RG. MERS, SARS and other coronaviruses as causes of pneumonia. *Respirology*. 2018 Feb; 23(2):130-7.
- Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of autoimmunity*. 2020 May 1; 109: 102433.
- Zhu Y, Chen W, Xin X, Yin Y, Hu J, Lv H, Li W, Deng X, Zhu C, Zhu J, Zhang J. Epidemiologic characteristics of traumatic fractures in elderly patients during the outbreak of coronavirus disease 2019 in China. *International orthopaedics*. 2020 Aug; 44(8): 1565-70.
- Heckman JD, McKee M, McQueen MM, Ricci W, Tornetta III P. Rockwood and Green's fractures in adults. Lippincott Williams & Wilkins; 2014 Sep 4.
- Westbury LD, Syddall HE, Fuggle NR, Dennison EM, Cauley JA, Shiroma EJ, Fielding RA, Newman AB, Cooper C (2020) Long-term rates of change in musculoskeletal aging and body composition: findings from the health, aging and body composition study. *Calcif Tissue Int* (Mar 3). <https://doi.org/10.1007/s00223-020-00679-2>
- Zhang Q, Cai W, Wang G, Shen X (2020) Prevalence and contributing factors of osteoporosis in the elderly over 70 years old: an epidemiological study of several community health centers in Shanghai. *Ann. Palliat Med*. <https://doi.org/10.21037/apm.2020.02.09>.
- Lv H, Zhang Q, Yin Y, et al. Epidemiologic characteristics of traumatic fractures during the outbreak of coronavirus disease 2019 (COVID-19) in China: A retrospective & comparative multi-center study. *Injury*. 2020; S0020-1383(20)30522-2.11.
- Chen W, Lv H, Liu S, et al. National incidence of traumatic fractures in China: a retrospective survey of 512-187 individuals. *Lancet Glob Health*. 2017; 5(8): e807-e817.
- Court-Brown CM, McQueen MM. Global forum: fractures in the elderly. *J Bone Joint Surg Am*. 2016; 98(9): e36-e42.
- Zhu Y, Chen W, Xin X, Yin Y, Hu J, Lv H, Li W, Deng X, Zhu C, Zhu J, Zhang J. Epidemiologic characteristics of traumatic fractures in elderly patients during the outbreak of coronavirus disease 2019 in China. *International orthopaedics*. 2020 Aug; 44(8): 1565-70.
- Morgan C, Ahluwalia AK, Aframian A, Li L, Sun SN. The impact of the novel coronavirus on trauma and orthopaedics in the UK. *British Journal of Hospital Medicine*. 2020 Apr 2:1-6.



18. Morgan C, Ahluwalia AK, Aframian A, Li L, Sun SN. The impact of the novel coronavirus on trauma and orthopaedics in the UK. *British Journal of Hospital Medicine*. 2020 Apr 2;1-6.
19. Hernigou J, Morel X, Callewier A, Bath O, Hernigou P. Staying home during "COVID-19" decreased fractures, but trauma did not quarantine in one hundred and twelve adults and twenty eight children and the "tsunami of recommendations" could not lockdown twelve elective operations. *International orthopaedics*. 2020 Aug; 44: 1473-80.
20. Iyengar K, Vaish A, Vaishya R. Revisiting conservative orthopaedic management of fractures during COVID-19 pandemic. *Journal of Clinical Orthopaedics and Trauma*. 2020 Jul 1; 11(4): 718-20.
21. Puzzitiello RN, Pagani NR, Moverman MA, Moon AS, Menendez ME, Ryan SP. Inflammatory and coagulative considerations for the management of orthopaedic trauma patients with COVID-19: a review of the current evidence and our surgical experience. *Journal of orthopaedic trauma*. 2020 Aug 1.
22. Chen YC, Lin WC. Risk of long-term infection-related death in clinical osteoporotic vertebral fractures: a hospital-based analysis. *PLoS One*. 2017 Aug 9; 12(8): e0182614.
23. Samsami M, Zebbarjadi Bagherpour J, Nematihonar B, Tahmasbi H (2020) COVID-19 pneumonia in asymptomatic trauma patients; report of 8 cases. *Arch AcadEmerg Med* 8(1):e46.
24. Mackay ND, Wilding CP, Langley CR, Young J. The impact of COVID-19 on trauma and orthopaedic patients requiring surgery during the peak of the pandemic: a retrospective cohort study. *Bone & joint open*. 2020 Sep 1; 1(9):520-9.
25. Ambrosio L, Vadalà G, Russo F, Papalia R, Denaro V. The role of the orthopaedic surgeon in the COVID-19 era: cautions and perspectives. *Journal of Experimental Orthopaedics*. 2020 Dec; 7: 1-9.
26. Wallace CN, Kontoghiorghe C, Kayani B, Chang JS, Haddad FS. The impact of COVID-19 on trauma and orthopaedic surgery in the United Kingdom. *Bone & joint open*. 2020 Jul 1; 1(7): 420-3.
27. Oussedik S, Zagra L, Shin GY, D'Apolito R, Haddad FS. Reinstating elective orthopaedic surgery in the age of COVID-19. *The bone & joint journal*. 2020 Jul; 102(7): 807-10.
28. Awad ME, Rumley JC, Vazquez JA, Devine JG. Perioperative considerations in urgent surgical care of suspected and confirmed COVID-19 orthopaedic patients: operating room protocols and recommendations in the current COVID-19 pandemic. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*. 2020 Jun 1; 28(11): 451-63.
29. Megaloikonomos PD, Thaler M, Igoumenou VG, Bonanzinga T, Ostojic M, Couto AF, Diallo J, Khosravi I. Impact of the COVID-19 pandemic on orthopaedic and trauma surgery training in Europe. *International orthopaedics*. 2020 Sep; 44(9): 1611-9.
30. Guo X, Wang J, Hu D, Wu L, Gu L, Wang Y, Zhao J, Zeng L, Zhang J, Wu Y. Survey of COVID-19 disease among orthopaedic surgeons in Wuhan, People's Republic of China. *The Journal of bone and joint surgery. American volume*. 2020 Apr 8.
31. Fineberg HV 2020. Ten weeks to crush the curve.
32. Re-starting non-urgent trauma and Orthopaedic care: Full guidance. *British Orthopaedic Association*.
33. Liang ZC, Chong MS, Sim MA, Lim JL, Castañeda P, Green DW, Fisher D, Ti LK, Murphy D, Hui JH. Surgical considerations in patients with COVID-19: what orthopaedic surgeons should know. *The Journal of bone and joint surgery. American volume*. 2020 Jun 3.
34. Neradi D, Hooda A, Shetty A, Kumar D, Salaria AK, Goni V. Management of orthopaedic patients during COVID-19 Pandemic in India: a guide. *Indian journal of orthopaedics*. 2020 May; 54(3): 402-7.
35. Kumar, R., & Pal, R. (2018). India achieves WHO recommended doctor population ratio: A call for paradigm shift in public health discourse! *J Fam Med Prim Care.*, 7(5), 841–844.
36. Mossa-Basha, M., Meltzer, C. C., Kim, D. C., Tuite, M. J., Kolli, K. P., & Tan, B. S. (2020). Radiology department preparedness for COVID-19: Radiology scientific expert panel. *Radiology*, 16, 200988.
37. Rutala WA, Weber DJ. Disinfectants used for environmental disinfection and new room decontamination technology. *Am J Infect Control*. 2013; 41: S36–41.
38. Donskey CJ. Does improving surface cleaning and disinfection reduce health care-associated infections? *Am J Infect Control*. 2013; 41:S12–9.
39. Rutala WA, Gergen MF, Weber DJ. Efficacy of improved hydrogen peroxide against important healthcare-associated pathogens. *Infect Control Hosp Epidemiol*. 2012; 33: 1159–61.
40. Rutala WA, Weber DJ. Disinfection, sterilization, and antisepsis: An overview. *American journal of infection control*. 2016 May 2; 44(5): e1-6.
41. Cheng L, Chen L, Xiao L, Zhang J, Cheng Y, Zhou L, Peng Y, Liu L. Problems and solutions of personal protective equipment doffing in COVID-19. *Open Medicine*. 2020 Jul 2; 15(1): 605-12.
42. Fu Q, Zhang X, Li S. Risk management strategies for occupational exposure of medical staff with novel coronavirus infections. *Chinese J Nosocomiol*. 2020; 6: 1–5. <http://kns.cnki.net/kcms/detail/11.3456.r.20200219.1629.008>.
43. Gharaibeh MA, Al Mohammad B, Gharaibeh B, Khasawneh L, Al-Naser S. Guidelines for the

- orthopedic surgeon in the era of COVID-19. *Orthopedic Reviews*. 2020 Dec 31; 12(4).
44. Chhabra HS, Bagaria V, Keny S, Kalidindi KK, Mallepally A, Dhillon MS, Malhotra R, Rajasekharan S. COVID-19: Current knowledge and best practices for orthopaedic surgeons. *Indian journal of orthopaedics*. 2020 Jul; 54: 411-25.
  45. Clement ND, Hall AJ, Makaram NS, Robinson PG, Patton RF, Moran M, Macpherson GJ, Duckworth AD, Jenkins PJ. IMPACT-Restart: the influence of COVID-19 on postoperative mortality and risk factors associated with SARS-CoV-2 infection after orthopaedic and trauma surgery. *The bone & joint journal*. 2020 Oct 1; 102(12):1774-81.
  46. Randelli PS, Compagnoni R. Management of orthopaedic and traumatology patients during the Coronavirus disease (COVID-19) pandemic in northern Italy.
  47. Rodrigues-Pinto R, Sousa R, Oliveira A. Preparing to perform trauma and orthopaedic surgery on patients with COVID-19. *The Journal of bone and joint surgery. American volume*. 2020 Apr 10.
  48. Keny S, Bagaria V, Chaudhary K, Dhawale A. Emergency and urgent orthopaedic surgeries in non-covid patients during the COVID 19 pandemic: perspective from India. *Journal of orthopaedics*. 2020 Jul 1; 20: 275-9.
  49. Liang ZC, Wang W, Murphy D, Hui JH. Novel coronavirus and orthopaedic surgery: early experiences from Singapore. *The Journal of bone and joint surgery. American volume*. 2020 Mar 20.
  50. Rodrigues-Pinto R, Sousa R, Oliveira A. Preparing to perform trauma and orthopaedic surgery on patients with COVID-19. *The Journal of bone and joint surgery. American volume*. 2020 Apr 10.
  51. Hirschmann MT, Hart A, Henckel J, Sadoghi P, Seil R, Mouton C. COVID-19 coronavirus: recommended personal protective equipment for the orthopaedic and trauma surgeon. *Knee Surgery, Sports Traumatology, Arthroscopy*. 2020 Jun; 28(6):1690-8.
  52. Simpson AH, Dall G, Haas JG. COVID-19: potential transmission through aerosols in surgical procedures and blood products. *Bone & Joint Research*. 2020 Apr; 9(4): 200-1.
  53. de Caro F, Hirschmann TM, Verdonk P. Returning to orthopaedic business as usual after COVID-19: strategies and options. *Knee Surgery, Sports Traumatology, Arthroscopy*. 2020 Jun; 28(6): 1699-704.
  54. Guidelines by Indian Orthopaedic Association: Suggestions for Orthopaedic Practice during COVID-19. Realised on 14<sup>th</sup> April 2020, 1<sup>st</sup> Update – 5<sup>th</sup> May 2020, 2<sup>nd</sup> Update – 8<sup>th</sup> June 2020.
  55. Tang PF, Hou ZY, Wu XB, Zhang CQ, Wang JW, Xing X, et al. Orthopedic Trauma Branch of Chinese Orthopaedic Association, External Fixation and Limb Reconstruction Branch of Chinese Orthopaedic Association, Trauma Expert Committee of Chinese Association of Orthopedic Surgeons. Expert consensus on management principles of orthopedic emergency in the epidemic of corona virus disease 2019. *Chin J Orthop Trauma* 2020; 22: 8–11. doi: 10.3760/cma.j.issn.1671-7600.2020.02.000.
  56. British Orthopaedic Association. Management of Patients with Urgent Orthopaedic Conditions and Trauma during the Coronavirus Pandemic; 2020. Accessed <https://www.boa.ac.uk/uploads/assets/ee39d8a8-945745339774e973c835246d/COVID-19-BOASTs-Combined-v1FINAL.pdf>. Accessed May 8, 2020.
  57. NHS England and NHS Improvement Coronavirus. Specialty Guides-Major Trauma; 2020. <https://www.england.nhs.uk/corona-virus/wp-content/uploads/sites/52/2020/03/C0070-specialty-guide-major-trauma-clinicalguide-27-march-2020.pdf>.
  58. Bram JT, Johnson MA, Magee LC, Mehta NN, Fazal FZ, Baldwin KD, Riley J, Shah AS. Where have all the fractures gone? The epidemiology of pediatric fractures during the COVID-19 pandemic. *Journal of Pediatric Orthopaedics*. 2020 Sep 1; 40(8): 373-9.

# GLOBAL JOURNALS GUIDELINES HANDBOOK 2021

---

[WWW.GLOBALJOURNALS.ORG](http://WWW.GLOBALJOURNALS.ORG)

# MEMBERSHIPS

## FELLOWS/ASSOCIATES OF MEDICAL RESEARCH COUNCIL

### FMRC/AMRC MEMBERSHIPS

#### INTRODUCTION



FMRC/AMRC is the most prestigious membership of Global Journals accredited by Open Association of Research Society, U.S.A (OARS). The credentials of Fellow and Associate designations signify that the researcher has gained the knowledge of the fundamental and high-level concepts, and is a subject matter expert, proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice. The credentials are designated only to the researchers, scientists, and professionals that have been selected by a rigorous process by our Editorial Board and Management Board.

Associates of FMRC/AMRC are scientists and researchers from around the world are working on projects/researches that have huge potentials. Members support Global Journals' mission to advance technology for humanity and the profession.

## FMRC

### FELLOW OF MEDICAL RESEARCH COUNCIL

FELLOW OF MEDICAL RESEARCH COUNCIL is the most prestigious membership of Global Journals. It is an award and membership granted to individuals that the Open Association of Research Society judges to have made a 'substantial contribution to the improvement of computer science, technology, and electronics engineering.

The primary objective is to recognize the leaders in research and scientific fields of the current era with a global perspective and to create a channel between them and other researchers for better exposure and knowledge sharing. Members are most eminent scientists, engineers, and technologists from all across the world. Fellows are elected for life through a peer review process on the basis of excellence in the respective domain. There is no limit on the number of new nominations made in any year. Each year, the Open Association of Research Society elect up to 12 new Fellow Members.



## BENEFIT

### TO THE INSTITUTION

#### GET LETTER OF APPRECIATION

Global Journals sends a letter of appreciation of author to the Dean or CEO of the University or Company of which author is a part, signed by editor in chief or chief author.



### EXCLUSIVE NETWORK

#### GET ACCESS TO A CLOSED NETWORK

A FMRC member gets access to a closed network of Tier 1 researchers and scientists with direct communication channel through our website. Fellows can reach out to other members or researchers directly. They should also be open to reaching out by other.

[Career](#)[Credibility](#)[Exclusive](#)[Reputation](#)

### CERTIFICATE

#### CERTIFICATE, LOR AND LASER-MOMENTO

Fellows receive a printed copy of a certificate signed by our Chief Author that may be used for academic purposes and a personal recommendation letter to the dean of member's university.

[Career](#)[Credibility](#)[Exclusive](#)[Reputation](#)

### DESIGNATION

#### GET HONORED TITLE OF MEMBERSHIP

Fellows can use the honored title of membership. The "FMRC" is an honored title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FMRC or William Walldroff, M.S., FMRC.

[Career](#)[Credibility](#)[Exclusive](#)[Reputation](#)

### RECOGNITION ON THE PLATFORM

#### BETTER VISIBILITY AND CITATION

All the Fellow members of FMRC get a badge of "Leading Member of Global Journals" on the Research Community that distinguishes them from others. Additionally, the profile is also partially maintained by our team for better visibility and citation. All fellows get a dedicated page on the website with their biography.

[Career](#)[Credibility](#)[Reputation](#)



## FUTURE WORK

### GET DISCOUNTS ON THE FUTURE PUBLICATIONS

Fellows receive discounts on the future publications with Global Journals up to 60%. Through our recommendation programs, members also receive discounts on publications made with OARS affiliated organizations.

Career

Financial



## GJ INTERNAL ACCOUNT

### UNLIMITED FORWARD OF EMAILS

Fellows get secure and fast GJ work emails with unlimited storage of emails that they may use them as their primary email. For example, john [AT] globaljournals [DOT] org.

Career

Credibility

Reputation



## PREMIUM TOOLS

### ACCESS TO ALL THE PREMIUM TOOLS

To take future researches to the zenith, fellows receive access to all the premium tools that Global Journals have to offer along with the partnership with some of the best marketing leading tools out there.

Financial

## CONFERENCES & EVENTS

### ORGANIZE SEMINAR/CONFERENCE

Fellows are authorized to organize symposium/seminar/conference on behalf of Global Journal Incorporation (USA). They can also participate in the same organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent. Additionally, they get free research conferences (and others) alerts.

Career

Credibility

Financial

## EARLY INVITATIONS

### EARLY INVITATIONS TO ALL THE SYMPOSIUMS, SEMINARS, CONFERENCES

All fellows receive the early invitations to all the symposiums, seminars, conferences and webinars hosted by Global Journals in their subject.

Exclusive



## PUBLISHING ARTICLES & BOOKS

### EARN 60% OF SALES PROCEEDS

Fellows can publish articles (limited) without any fees. Also, they can earn up to 70% of sales proceeds from the sale of reference/review books/literature/publishing of research paper. The FMRC member can decide its price and we can help in making the right decision.

Exclusive

Financial

## REVIEWERS

### GET A REMUNERATION OF 15% OF AUTHOR FEES

Fellow members are eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get a remuneration of 15% of author fees, taken from the author of a respective paper.

Financial

## ACCESS TO EDITORIAL BOARD

### BECOME A MEMBER OF THE EDITORIAL BOARD

Fellows and Associates may join as a member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer.

Career

Credibility

Exclusive

Reputation

## AND MUCH MORE

### GET ACCESS TO SCIENTIFIC MUSEUMS AND OBSERVATORIES ACROSS THE GLOBE

All members get access to 5 selected scientific museums and observatories across the globe. All researches published with Global Journals will be kept under deep archival facilities across regions for future protections and disaster recovery. They get 10 GB free secure cloud access for storing research files.

### ASSOCIATE OF MEDICAL RESEARCH COUNCIL

ASSOCIATE OF MEDICAL RESEARCH COUNCIL is the membership of Global Journals awarded to individuals that the Open Association of Research Society judges to have made a 'substantial contribution to the improvement of computer science, technology, and electronics engineering.

The primary objective is to recognize the leaders in research and scientific fields of the current era with a global perspective and to create a channel between them and other researchers for better exposure and knowledge sharing. Members are most eminent scientists, engineers, and technologists from all across the world. Associate membership can later be promoted to Fellow Membership. Associates are elected for life through a peer review process on the basis of excellence in the respective domain. There is no limit on the number of new nominations made in any year. Each year, the Open Association of Research Society elect up to 12 new Associate Members.



## BENEFIT

### TO THE INSTITUTION

#### GET LETTER OF APPRECIATION

Global Journals sends a letter of appreciation of author to the Dean or CEO of the University or Company of which author is a part, signed by editor in chief or chief author.



### EXCLUSIVE NETWORK

#### GET ACCESS TO A CLOSED NETWORK

A AMRC member gets access to a closed network of Tier 2 researchers and scientists with direct communication channel through our website. Associates can reach out to other members or researchers directly. They should also be open to reaching out by other.

Career

Credibility

Exclusive

Reputation



### CERTIFICATE

#### CERTIFICATE, LOR AND LASER-MOMENTO

Associates receive a printed copy of a certificate signed by our Chief Author that may be used for academic purposes and a personal recommendation letter to the dean of member's university.

Career

Credibility

Exclusive

Reputation



### DESIGNATION

#### GET HONORED TITLE OF MEMBERSHIP

Associates can use the honored title of membership. The "AMRC" is an honored title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., AMRC or William Walldroff, M.S., AMRC.

Career

Credibility

Exclusive

Reputation

### RECOGNITION ON THE PLATFORM

#### BETTER VISIBILITY AND CITATION

All the Associate members of AMRC get a badge of "Leading Member of Global Journals" on the Research Community that distinguishes them from others. Additionally, the profile is also partially maintained by our team for better visibility and citation.

Career

Credibility

Reputation

## FUTURE WORK

### GET DISCOUNTS ON THE FUTURE PUBLICATIONS

Associates receive discounts on future publications with Global Journals up to 30%. Through our recommendation programs, members also receive discounts on publications made with OARS affiliated organizations.

Career

Financial



## GJ ACCOUNT

### UNLIMITED FORWARD OF EMAILS

Associates get secure and fast GJ work emails with 5GB forward of emails that they may use them as their primary email. For example, john [AT] globaljournals [DOT] org.

Career

Credibility

Reputation



## PREMIUM TOOLS

### ACCESS TO ALL THE PREMIUM TOOLS

To take future researches to the zenith, fellows receive access to almost all the premium tools that Global Journals have to offer along with the partnership with some of the best marketing leading tools out there.

Financial

## CONFERENCES & EVENTS

### ORGANIZE SEMINAR/CONFERENCE

Associates are authorized to organize symposium/seminar/conference on behalf of Global Journal Incorporation (USA). They can also participate in the same organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent. Additionally, they get free research conferences (and others) alerts.

Career

Credibility

Financial

## EARLY INVITATIONS

### EARLY INVITATIONS TO ALL THE SYMPOSIUMS, SEMINARS, CONFERENCES

All associates receive the early invitations to all the symposiums, seminars, conferences and webinars hosted by Global Journals in their subject.

Exclusive





## PUBLISHING ARTICLES & BOOKS

### EARN 60% OF SALES PROCEEDS

Associates can publish articles (limited) without any fees. Also, they can earn up to 30-40% of sales proceeds from the sale of reference/review books/literature/publishing of research paper

Exclusive

Financial

## REVIEWERS

### GET A REMUNERATION OF 15% OF AUTHOR FEES

Associate members are eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get a remuneration of 15% of author fees, taken from the author of a respective paper.

Financial

## AND MUCH MORE

### GET ACCESS TO SCIENTIFIC MUSEUMS AND OBSERVATORIES ACROSS THE GLOBE

All members get access to 2 selected scientific museums and observatories across the globe. All researches published with Global Journals will be kept under deep archival facilities across regions for future protections and disaster recovery. They get 5 GB free secure cloud access for storing research files.



ASSOCIATE	FELLOW	RESEARCH GROUP	BASIC
<b>\$4800</b> lifetime designation	<b>\$6800</b> lifetime designation	<b>\$12500.00</b> organizational	<b>APC</b> per article
<b>Certificate</b> , LoR and Momento 2 discounted publishing/year <b>Gradation</b> of Research 10 research contacts/day 1 GB Cloud Storage GJ Community Access	<b>Certificate</b> , LoR and Momento <b>Unlimited</b> discounted publishing/year <b>Gradation</b> of Research <b>Unlimited</b> research contacts/day 5 GB Cloud Storage <b>Online Presense</b> Assistance GJ Community Access	<b>Certificates</b> , LoRs and Momentos <b>Unlimited</b> free publishing/year <b>Gradation</b> of Research <b>Unlimited</b> research contacts/day <b>Unlimited</b> Cloud Storage <b>Online Presense</b> Assistance GJ Community Access	GJ Community Access



# PREFERRED AUTHOR GUIDELINES

## **We accept the manuscript submissions in any standard (generic) format.**

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from <https://globaljournals.org/Template>

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at [submit@globaljournals.org](mailto:submit@globaljournals.org) or get in touch with [chiefeditor@globaljournals.org](mailto:chiefeditor@globaljournals.org) if they wish to send the abstract before submission.

## BEFORE AND DURING SUBMISSION

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct*, along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

## **Declaration of Conflicts of Interest**

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

## POLICY ON PLAGIARISM

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures



- Printed material
- Graphic representations
- Computer programs
- Electronic material
- Any other original work

## AUTHORSHIP POLICIES

Global Journals follows the definition of authorship set up by the Open Association of Research Society, USA. According to its guidelines, authorship criteria must be based on:

1. Substantial contributions to the conception and acquisition of data, analysis, and interpretation of findings.
2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

### Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

### Copyright

During submission of the manuscript, the author is confirming an exclusive license agreement with Global Journals which gives Global Journals the authority to reproduce, reuse, and republish authors' research. We also believe in flexible copyright terms where copyright may remain with authors/employers/institutions as well. Contact your editor after acceptance to choose your copyright policy. You may follow this form for copyright transfers.

### Appealing Decisions

Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

### Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

### Declaration of funding sources

Global Journals is in partnership with various universities, laboratories, and other institutions worldwide in the research domain. Authors are requested to disclose their source of funding during every stage of their research, such as making analysis, performing laboratory operations, computing data, and using institutional resources, from writing an article to its submission. This will also help authors to get reimbursements by requesting an open access publication letter from Global Journals and submitting to the respective funding source.

## PREPARING YOUR MANUSCRIPT

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.



### ***Manuscript Style Instruction (Optional)***

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

### ***Structure and Format of Manuscript***

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

- i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.





## FORMAT STRUCTURE

***It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.***

All manuscripts submitted to Global Journals should include:

### **Title**

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

### **Author details**

The full postal address of any related author(s) must be specified.

### **Abstract**

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

### **Keywords**

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

### **Numerical Methods**

Numerical methods used should be transparent and, where appropriate, supported by references.

### **Abbreviations**

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

### **Formulas and equations**

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

### **Tables, Figures, and Figure Legends**

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.



## Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

### PREPARATION OF ELETRONIC FIGURES FOR PUBLICATION

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

### TIPS FOR WRITING A GOOD QUALITY MEDICAL RESEARCH PAPER

**1. Choosing the topic:** In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

**2. Think like evaluators:** If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

**3. Ask your guides:** If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

**4. Use of computer is recommended:** As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

**5. Use the internet for help:** An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



**6. Bookmarks are useful:** When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

**7. Revise what you wrote:** When you write anything, always read it, summarize it, and then finalize it.

**8. Make every effort:** Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

**9. Produce good diagrams of your own:** Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

**10. Use proper verb tense:** Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

**11. Pick a good study spot:** Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

**12. Know what you know:** Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

**13. Use good grammar:** Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

**14. Arrangement of information:** Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

**15. Never start at the last minute:** Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

**16. Multitasking in research is not good:** Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

**17. Never copy others' work:** Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

**18. Go to seminars:** Attend seminars if the topic is relevant to your research area. Utilize all your resources.

**19. Refresh your mind after intervals:** Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.



**20. Think technically:** Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

**21. Adding unnecessary information:** Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

**22. Report concluded results:** Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

**23. Upon conclusion:** Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

## INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

### Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

### Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

*The introduction:* This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

### The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

### General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

**To make a paper clear:** Adhere to recommended page limits.



### *Mistakes to avoid:*

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

### **Title page:**

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

**Abstract:** This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

*Reason for writing the article—theory, overall issue, purpose.*

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

### **Approach:**

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

### **Introduction:**

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.





*The following approach can create a valuable beginning:*

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

#### **Approach:**

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

#### **Procedures (methods and materials):**

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

#### **Materials:**

*Materials may be reported in part of a section or else they may be recognized along with your measures.*

#### **Methods:**

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

#### **Approach:**

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

#### **What to keep away from:**

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



**Results:**

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

**Content:**

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

**What to stay away from:**

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

**Approach:**

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

**Figures and tables:**

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

**Discussion:**

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."



Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

#### **Approach:**

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

### THE ADMINISTRATION RULES

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

*Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.*

*Segment draft and final research paper:* You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

*Written material:* You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.



CRITERION FOR GRADING A RESEARCH PAPER (COMPILATION)  
BY GLOBAL JOURNALS

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
<i>Methods and Procedures</i>	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
<i>Result</i>	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
<i>Discussion</i>	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



# INDEX

<b>A</b>	<b>S</b>
Articular · 1, 2, 3, 5, 8, 10, 11, 29, 30, 31, 33, 34	Stratified · 30
<b>C</b>	<b>V</b>
Concomitantly · 17	Visceral · 29, 31, 33, 34
Conformity · 29	
<b>D</b>	
Debridement · 20, 21, 22, 24, 26	
Deviate · 31	
<b>E</b>	
Escalation · 31	
<b>I</b>	
Inclination · 1, 2, 3, 5, 7, 8, 9	
Invasion · 14	
<b>L</b>	
Lacerations · 20, 21, 22, 26	
<b>M</b>	
Malignant · 13, 17	
<b>P</b>	
Palliative · 16, 17	
<b>R</b>	
Resection · 16, 17	





save our planet



# Global Journal of Medical Research

---

Visit us on the Web at [www.GlobalJournals.org](http://www.GlobalJournals.org) | [www.MedicalResearchJournal.org](http://www.MedicalResearchJournal.org)  
or email us at [helpdesk@globaljournals.org](mailto:helpdesk@globaljournals.org)

ISSN 9755896



© Global Journals