

World Journal of *Orthopedics*

World J Orthop 2022 April 18; 13(4): 339-410



REVIEW

- 339 Antibiotic-free antimicrobial poly (methyl methacrylate) bone cements: A state-of-the-art review
Lewis G

MINIREVIEWS

- 354 Lateral epicondylitis: New trends and challenges in treatment
Karabinov V, Georgiev GP

ORIGINAL ARTICLE

Retrospective Cohort Study

- 365 Is it necessary to fuse to the pelvis when correcting scoliosis in cerebral palsy?
Strom SF, Hess MC, Jardaly AH, Conklin MJ, Gilbert SR

Retrospective Study

- 373 Comparing complications of outpatient management of slipped capital femoral epiphysis and Blount's disease: A database study
Jardaly A, Torrez TW, McGwin G, Gilbert SR
- 381 Minimally invasive outpatient management of iliopsoas muscle abscess in complicated spondylodiscitis
Fesatidou V, Petsatodis E, Kitridis D, Givissis P, Samoladas E
- 388 Direct anterior approach hip arthroplasty: How to reduce complications - A 10-years single center experience and literature review
Rivera F, Comba LC, Bardelli A
- 400 Integrity of the hip capsule measured with magnetic resonance imaging after capsular repair or unrepaired capsulotomy in hip arthroscopy
Bech NH, van Dijk LA, de Waard S, Vuurberg G, Sierevelt IN, Kerkhoffs GM, Haverkamp D

LETTER TO THE EDITOR

- 408 Existing fixation modalities for Jones type fifth metatarsal fracture fixation pose high rates of complications and nonunion
Anastasios AT, Parekh SG

ABOUT COVER

Editorial Board Member of *World Journal of Orthopedics*, Rogerio Leone Buchaim, PhD, Associate Professor, Department of Biological Sciences, Bauru School of Dentistry, University of Sao Paulo, Bauru 17012901, São Paulo, Brazil. rogerio@fob.usp.br

AIMS AND SCOPE

The primary aim of *World Journal of Orthopedics* (*WJO*, *World J Orthop*) is to provide scholars and readers from various fields of orthopedics with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJO mainly publishes articles reporting research results and findings obtained in the field of orthopedics and covering a wide range of topics including arthroscopy, bone trauma, bone tumors, hand and foot surgery, joint surgery, orthopedic trauma, osteoarthropathy, osteoporosis, pediatric orthopedics, spinal diseases, spine surgery, and sports medicine.

INDEXING/ABSTRACTING

The *WJO* is now abstracted and indexed in PubMed, PubMed Central, Emerging Sources Citation Index (Web of Science), Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2021 edition of Journal Citation Reports® cites the 2020 Journal Citation Indicator (JCI) for *WJO* as 0.66. The *WJO*'s CiteScore for 2020 is 3.2 and Scopus CiteScore rank 2020: Orthopedics and Sports Medicine is 87/262.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: *Ying-Yi Yuan*, Production Department Director: *Xiang Li*, Editorial Office Director: *Jin-Lei Wang*.

NAME OF JOURNAL

World Journal of Orthopedics

ISSN

ISSN 2218-5836 (online)

LAUNCH DATE

November 18, 2010

FREQUENCY

Monthly

EDITORS-IN-CHIEF

Massimiliano Leigheb

EDITORIAL BOARD MEMBERS

<http://www.wjgnet.com/2218-5836/editorialboard.htm>

PUBLICATION DATE

April 18, 2022

COPYRIGHT

© 2022 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>



Existing fixation modalities for Jones type fifth metatarsal fracture fixation pose high rates of complications and nonunion

Albert Thomas Anastasio, Selene G Parekh

Specialty type: Orthopedics

Provenance and peer review:

Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): A

Grade B (Very good): B

Grade C (Good): 0

Grade D (Fair): 0

Grade E (Poor): 0

P-Reviewer: Malkova TA, Russia;
Nishikawa DRC, Brazil

Received: October 4, 2021

Peer-review started: October 4, 2021

First decision: December 9, 2021

Revised: December 12, 2021

Accepted: March 27, 2022

Article in press: March 27, 2022

Published online: April 18, 2022



Albert Thomas Anastasio, Department of Orthopedic Surgery, Duke University Health System, Durham, NC 27710, United States

Selene G Parekh, Department of Orthopaedic Surgery, Duke University Hospital, Durham, NC 27710, United States

Corresponding author: Albert Thomas Anastasio, MD, Surgeon, Department of Orthopedic Surgery, Duke University Health System, 2301 Erwin Rd, Durham, NC 27710, United States. albert.anastasio@duke.edu

Abstract

Jones type fifth metatarsal fractures pose a challenge to the foot and ankle surgeon, given documented high nonunion rates as well as high complication rates including hardware prominence, nerve injury, and screw breakage for existing treatment modalities including screw and plantar plate fixation. We call for the design of innovative Jones-fracture specific implants which contour to the natural curve of the fifth metatarsal. Future research should aim to expand upon existing literature for Jones fracture fixation and evaluate efficacy of novel implants which are designed to address unacceptably high complication rates for existing treatment modalities.

Key Words: Jones; Metatarsal base; Fifth metatarsal; Athlete; Nonunion; Malunion

©The Author(s) 2022. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: Jones type fifth metatarsal fractures have high rates of complications and fixation failure. While intramedullary screw fixation is the current accepted treatment modality, we call for innovation in the treatment options for Jones fracture fixation to more appropriately address the challenges seen with this fracture pattern in the high level athlete.

Citation: Anastasio AT, Parekh SG. Existing fixation modalities for Jones type fifth metatarsal fracture fixation pose high rates of complications and nonunion. *World J Orthop* 2022; 13(4): 408-410

URL: <https://www.wjgnet.com/2218-5836/full/v13/i4/408.htm>

DOI: <https://dx.doi.org/10.5312/wjo.v13.i4.408>

TO THE EDITOR

We read with interest a review article from Albloushi *et al*[1], who present an excellent overview of pathoanatomy, classification, and current concepts of fixation modalities for Jones type fifth metatarsal fracture. We thank the authors for this valuable contribution, and we agree with their conclusion that there remains a lack of consensus on the effective management of Jones fractures, especially in the high-level athlete group. In part, we believe this lack of consensus may be due to unacceptably high complication rates of existing surgical treatments.

Both delayed union and nonunion remain a challenging problem after Jones fracture fixation. The authors note that delayed union in zone 2 and 3 fractures are often the result of choosing screws that are smaller than 4.5 mm in diameter. They recommend utilization of larger screw diameters, especially in the athlete population. While we agree that smaller diameter screws often contribute to nonunion after Jones fixation, we also draw attention to the risk of cortical perforation and subsequent impingement related symptoms, and even potential nerve injury with use of the larger diameter screws[2]. The authors also mention the challenge in adequately appreciating the natural curvature of the fifth metatarsal during fracture fixation. The authors note that failure to maintain the screw within the cortical bone of the 5th metatarsal remains a major cause of nerve injury[3], and recommend meticulous choice of proper entry point of the guidewire and screw with the correct trajectory within the medullary canal. Still, achieving proper positioning of a straight screw within a bone with natural curvature is difficult, and the challenge is expounded when attempting to utilize a larger diameter screw in the case of the elite athlete. Moreover, cannulated screws have been shown to lack proper strength to withstand the significant and repetitive forces the fifth metatarsal must sustain and have been shown to be associated with screw breakage[4].

Despite the difficulties encountered with screw fixation of Jones fracture, plate fixation is also associated with substantial complication risk[5]. Nonunion rates have been unacceptably high in some series[6], and calcaneus autograft has become commonplace for the procedure, denoting an additional area of potential patient morbidity[7]. Hardware prominence also presents a unique challenge in the plating of the Jones fracture. Furthermore, soft tissue injury with the dissection required for proper plate placement flush against the cortical bone can be associated with nerve injury and periosteal stripping with destruction of native bone biology potentially impeding bony union.

With the high complication rates associated with the existing fixation modalities (intramedullary screw fixation and plantar plate fixation), there remains area for innovation with regards to treatment modalities for Jones fracture. Our institution has begun use of an intramedullary implant created specifically for Jones fracture fixation which we hope will be effective in reducing some of the listed complications. This implant has an inherent curve which is fabricated to closely aligned to the natural curvature of the fifth metatarsal. Furthermore, the implant has an end cap which serves to both compress across the fracture site and to reduce hardware prominence at the insertion site. To further enhance fixation at the distal end of the metatarsal, the implant has a talon based mechanism which once activated, provides further implant purchase distally to prevent screw pullout. A study at our institution is currently underway to evaluate whether or not these features lead to decreased complication rates and increased return to play and decreased time to bony union after Jones fracture fixation.

In summary, Jones fracture fixation remains a challenging problem for the foot and ankle surgeon. Existing treatment modalities are associated with high complication rates. Future research should aim to improve upon design elements of existing implants in an effort to effectively manage patients with this condition.

ACKNOWLEDGEMENTS

We would like to acknowledge the entire staff and support team at Duke University Department of Foot and Ankle and lower extremity Sports Medicine.

FOOTNOTES

Author contributions: Parekh SG designed research; Anastasio AT wrote the letter; and Parekh SG revised the letter.

Conflict-of-interest statement: Neither author reports any conflicts of interest.

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

Country/Territory of origin: United States

ORCID number: Albert Thomas Anastasio 0000-0001-5817-3826; Selene G Parekh 0000-0002-1308-9038.

S-Editor: Wang JL

L-Editor: A

P-Editor: Wang JL

REFERENCES

- 1 **Albloushi M**, Alshanqiti A, Qasem M, Abitbol A, Gregory T. Jones type fifth metatarsal fracture fixation in athletes: A review and current concept. *World J Orthop* 2021; **12**: 640-650 [PMID: 34631448 DOI: 10.5312/wjo.v12.i9.640]
- 2 **Watson GI**, Karnovsky SC, Konin G, Drakos MC. Optimal Starting Point for Fifth Metatarsal Zone II Fractures: A Cadaveric Study. *Foot Ankle Int* 2017; **38**: 802-807 [PMID: 28482680 DOI: 10.1177/1071100717702688]
- 3 **Aynardi MWK**, Wisbeck JM. Intramedullary Screw Fixation of Jones Fracture: The Crucial Starting Point and Minimizing Complications. *Orthop J Harvard Med Sch* 2019; **20**: 42-45 [DOI: 10.1016/j.fuspru.2011.10.005]
- 4 **Granata JD**, Berlet GC, Philbin TM, Jones G, Kaeding CC, Peterson KS. Failed Surgical Management of Acute Proximal Fifth Metatarsal (Jones) Fractures: A Retrospective Case Series and Literature Review. *Foot Ankle Spec* 2015; **8**: 454-459 [PMID: 26130624 DOI: 10.1177/1938640015592836]
- 5 **Haslan H**, Zar CT, Yahaya MY. Decision making in management of proximal fifth metatarsal fracture: a short review. *Med Health* 2016; **11**: 131-138 [DOI: 10.17576/MH.2016.1102.03]
- 6 **Bernstein DT**, Mitchell RJ, McCulloch PC, Harris JD, Varner KE. Treatment of Proximal Fifth Metatarsal Fractures and Refractures With Plantar Plating in Elite Athletes. *Foot Ankle Int* 2018; **39**: 1410-1415 [PMID: 30079768 DOI: 10.1177/1071100718791835]
- 7 **O'Malley MJ**, Sayres SC, Saleem O, Levine D, Roberts M, Deland JT, Ellis S. Morbidity and complications following percutaneous calcaneal autograft bone harvest. *Foot Ankle Int* 2014; **35**: 30-37 [PMID: 24318626 DOI: 10.1177/1071100713511806]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

