

Case Study

A case of Asymmetric Brachymetcarpia

Alexander Napoleon Kifle¹, Sosna Nega Bulto², Hawi Farris Muleta¹, Derejje Tufa Weldieselasie³, Dawit Alemayehu Tesfaye¹, Dawit Wondifraw Tilahun¹, Ashenafi Negash Tekle¹, Mateyas Bizualem¹, Henok Bahiru Wodajeneh⁴, Eyosias Lemma Teshome⁵

Affiliations:

¹St. Paul's Hospital Millennium Medical College, School of Medicine, Addis Ababa, Ethiopia

²Africa Medical College, Addis Ababa, Ethiopia

³Haramaya University, College of Health Sciences, School of Medicine, Department of Radiology, Harrar, Ethiopia

⁴Addis Ababa University, College of Health Sciences, Department of Internal Medicine, Addis Ababa, Ethiopia

⁵Addis Ababa University, College Natural Sciences, Addis Ababa, Ethiopia

Correspondence:

Alexander Napoleon Kifle

St. Paul's Hospital Millennium Medical College, School of Medicine, Department of Radiology, Addis Ababa, Ethiopia

Email: alexissanchez2115@gmail.com

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Abstract

Brachymetcarpia is a rare congenital condition characterized by the shortening of one or more metacarpal bones. It is often bilateral and symmetrical but can also present asymmetrically. We report a case of a 68-year-old woman who presented with chronic hand pain and was found to have asymmetrical brachymetcarpia with additional findings of osteoarthritis.

Keywords: Asymmetrical Brachymetcarpia, Osteoarthritis, Hand Deformity, Bell's Classification

Introduction

Brachymetacarpia is an uncommon congenital anomaly characterized by the shortening of metacarpal bones, usually due to premature closure of the growth plate (1, 2). It is most commonly observed in the 4th metacarpal, with a higher prevalence in females. The condition may occur as an isolated abnormality or as part of a syndrome (3). This case report presents a unique instance of asymmetrical brachymetacarpia associated with osteoarthritis in an elderly patient.

Case Description

A 68-year-old right-handed woman presented to the outpatient clinic with a history of chronic hand pain persisting for several years. She reported progressive difficulty in gripping objects and worsening joint stiffness. There was no history of trauma, systemic illness, or previous hand surgeries.

On physical examination, there was an evident shortening of the 5th and 3rd metacarpals on the left hand and the 2nd, 4th, and 5th digits on the right hand. The patient exhibited reduced grip strength and mild ulnar deviation of the fingers. Radiographs of both hands confirmed the presence of asymmetrical brachymetacarpia along with degenerative changes consistent with osteoarthritis, including joint space narrowing, osteophyte formation, and subchondral sclerosis (3).



Image 1: Frontal and lateral radiographs of both hands demonstrate brachymetacarpia, with notable shortening of the 5th and 3rd metacarpals on the left hand and shortening of the 2nd, 4th, and 5th digits on the right hand. There is evidence of osteoarthritic changes, including joint space narrowing, subchondral sclerosis, and marginal osteophyte formation, particularly at the distal interphalangeal joints. No acute fractures or dislocations are identified.

Discussion

Brachymetacarpia is classified using Bell's classification, which categorizes the condition into: A widely used classification of brachydactyly is that of Julia Bell. She classified brachydactyly into five types, A to E, and brachydactyly A is further sub-classified into A1–A5 (4, 5) (Table 1 and 2).

Table 1. Bell classification of brachydactyly

Bell Type	Description
A	Middle phalanx of one, several, or all fingers and toes are short Further sub-classified into A1–A5, see Table 2
B	Distal phalanges and nails of the fingers and/or toes are small or absent. Middle phalanges may also be short
C	Short middle phalanges of the second and third fingers, sometimes with short first metacarpal. Hyper segmentation of the proximal phalanx of the index and middle fingers. The ring finger is the longest finger
D	Distal phalanges of the thumbs and/or big toe short and broad
E	Long, ring and little metacarpals and metatarsals are short. But any of them may be affected

Table 2. Sub classification of brachydactyly Bell type A.

A Sub type	Description
A1	Broad hands, shortening of all digits. Middle phalanges and first phalanx are the most severely shortened. May be accompanied by symphalangism.
A2	Shortening confined to middle phalanx of the index finger
A3	Shortening confined to middle phalanx of the little finger
A4	Middle phalanges of index and little finger are short, with radial clinodactyly of the ring finger
A5	Absent middle phalanges

The present case falls under **Type E** due to the asymmetric involvement of different metacarpals in both hands. The association with osteoarthritis suggests possible mechanical stress adaptations over time (2). Brachymetacarpia may occur sporadically or as part of syndromic conditions such as Turner syndrome, pseudohypoparathyroidism, or multiple epiphyseal dysplasia (3). However, this patient had no other syndromic features.

Brachymetacarpia may lead to functional and cosmetic complaints if the metacarpal arch is affected. In isolated brachymetacarpia of the lesser metacarpals, the diagnosis is made early in childhood as the deformity is made evident when the child makes a fist⁴. When patients present late as adults treatment is usually not necessary. In our case since the patient already has been accustomed to the deformity and was totally unaware of this. Further to this, there was no functional deficit in our patient. The complaints of patients with brachymetacarpia are impaired hand function and cosmetic concerns. Impaired hand function possibly occurs due to the relative lengthening of the corresponding muscle-tendon unit resulting in reduced force generated from the contraction of these muscles, which can manifest as weakness of hand function (5). Nevertheless, our patient did not complain of these symptoms due to brachymetacarpia.

Treatment of brachymetacarpia is typically conservative unless significant functional impairment exists. Given the patient's age and the presence of osteoarthritis, management focused on symptomatic relief, including analgesics, hand physiotherapy, and occupational therapy. Surgical lengthening procedures, such as distraction

osteogenesis, were not considered due to the chronic nature of the symptoms and the patient's advanced age (2).

Conclusion

This case highlights a rare presentation of asymmetrical brachymetacarpia complicated by osteoarthritis in an elderly patient. Recognizing such variations is essential for proper diagnosis and management. Further research is needed to explore the long-term functional implications and optimal treatment strategies.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval

The report was conducted as per the Declaration of Helsinki. At Yekatit 12 Hospital medical college, the Institutional Review Board granted ethical clearance, including publishing this patient's case information. The patient's privacy and confidentiality were protected.

Consent

The patient gave written informed consent for this case report and any related images to be published.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

All authors contributed to data analysis, drafting, or revising of the article, have agreed on the journal to which the article will be submitted, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

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