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# Painful thumb carpometacarpal joint osteoarthritis: Results of a novel treatment approach

Denis Ehrl <sup>a,\*</sup>, Holger C. Erne <sup>b</sup>, P. Niclas Broer <sup>a</sup>,  
Christian Metz <sup>b</sup>, Erwin Falter <sup>b</sup>

<sup>a</sup> Department of Plastic, Reconstructive, Hand and Burn Surgery, Bogenhausen Academic Hospital, 81925 Munich, Germany

<sup>b</sup> Department of Plastic, Aesthetic Surgery and Hand Surgery, Kreisklinik Ebersberg, Pfarrer-Guggetzer-Str. 3, 85560 Ebersberg, Germany

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## KEYWORDS

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Denervation;  
Eaton littler stage II  
and III

**Summary** *Background:* Pain reduction as well as preservation and improvement in range of motion remain the main aims in the treatment of thumb carpometacarpal (CMC) osteoarthritis (OA). We performed a retrospective outcome analysis of patients with symptomatic stage II–III thumb CMC joint arthritis treated with denervation, joint lavage and capsular imbrication.

*Methods:* 73 patients with stage II to III OA of the thumb CMC-joint underwent the described technique. A total of 42 patients complied with follow-up assessment and were included in this study. Mean follow-up was 41.2 (range 12–81) months.

*Results:* Mean operative time was 28.4 ( $\pm 6.5$ ) minutes. The follow-up assessments showed a significant decrease in pain (preoperative Numerical Rating Scale (NRS): 7.5 – postoperative NRS: 1.1) ( $p < 0.0001$ ) and a significant improvement in function of the thumb (preoperative DASH-Score: 46.8; Cooney-Wrist-Score: 35.4; Krimmer-Wrist-Score: 38.3 – postoperative DASH-Score: 18.1; Cooney-Wrist-Score: 73.7; Krimmer-Wrist-Score: 80.0) ( $p < 0.0001$ ).

*Conclusion:* The findings of our study indicate that the presented treatment approach could be a good alternative to more invasive surgical options in patients with stage II–III CMC OA of the thumb, without impairing more invasive surgical options like trapeziectomy or arthroplasty for the future.

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\* Corresponding author. Department of Plastic, Reconstructive, Hand and Burn Surgery, Bogenhausen Academic Hospital, Technical University Munich, Engschalkingerstr. 77, 81925 Munich, Germany. Tel.: +49 08992702030; fax: +49 08992702035.

E-mail address: [Denis.Ehrl@klinikum-muenchen.de](mailto:Denis.Ehrl@klinikum-muenchen.de) (D. Ehrl).

## Introduction

Primary treatment option of symptomatic thumb carpometacarpal (CMC) joint osteoarthritis (OA) remains conservative, consisting of modification of daily activities, anti-inflammatory medication, steroid injections, splinting and physical therapy.<sup>1,2</sup> When non-operative treatments fail, several types of surgical intervention are available, with variable degrees of success.<sup>1,3–11</sup> The main aim of treatment is restoration of thumb function including a pain-free, stable and mobile joint with reasonable strength.<sup>2</sup>

The most commonly performed surgical treatment for painful thumb CMC joint OA consists of partial or complete trapeziectomy with or without ligament reconstruction with tendon interposition (LRTI).<sup>6–9,11–14</sup> Although trapeziectomy remains the “gold standard” treatment, it has disadvantages such as an extended recovery time, weakness of both pinch and grip strength, and potential instability of the thumb CMC joint.<sup>9,10,15–17</sup> Due to these drawbacks, other surgical solutions have been sought. One of these is thumb CMC joint denervation. Advantages of this approach include its’ simplicity, a relatively short recovery time and retaining the option of subsequent trapeziectomy or arthroplasty.<sup>18–22</sup>

Based on our clinical experience with denervation and arthroscopic approaches in the treatment of joint OA, we developed the technique of denervation, joint lavage and capsular imbrication of the thumb CMC joint.

Aim of this study was to assess the outcomes associated with this treatment option.

## Materials and methods

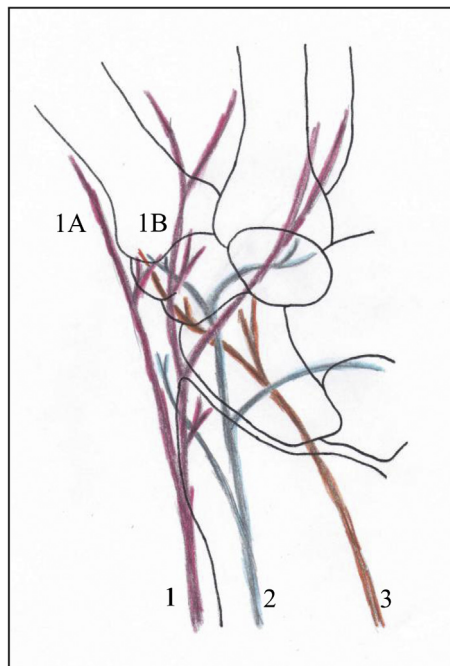
Over a period of 6.5 years, 73 patients with OA of the thumb CMC joint underwent the outlined treatment. The relevant past medical history provided by the patients was unreliable in some cases and many patients were previously treated in the outpatients’ setting, though none in our department, all patients primarily received conservative treatment, including a minimum of one steroid injection, at least 6 months prior to surgery. However, none of the patients reported sustained benefit. These patients were subsequently offered operative treatment to treat painful and radiologically confirmed Eaton and Littler<sup>23</sup> stages II or III OA of the thumb CMC joint. We informed all patients of the novelty of the technique and the anticipated relative advantages and disadvantages compared to other established techniques.

Inclusion criteria were: age of the patients >18 years, agreement to the novel treatment option and agreement to comply with follow-up exams for a minimum of 6 months. Exclusion criteria included prior surgery to the thumb CMC joint or stage I or IV OA. A total of 42 patients participated in the study. In order to evaluate the short- and long-time efficiency of the treatment, a separate analysis of patients with a maximum follow-up of 12 months and a minimum follow-up of 24 months was done. Patients having a maximum follow-up of 12 months were reviewed again with a minimum follow-up of 24 months and compared to the other group with minimum follow-up of 24 months.

## Surgical techniques

The soft tissues around the thumb CMC joint are exposed via a radial S shaped incision. The following nerve branches innervating the CMC joint are separated and divided: the dorso-radial and dorso-ulnar sensory branches from the radial nerve to the thumb with their accompanying vessels; the terminal branch of Cruveilhier<sup>24,25</sup> from the lateral antebrachial cutaneous nerve of the forearm; and the nerve branches from the palmar cutaneous branch of the median nerve (Figure 1).

Following the denervation, the abductor pollicis longus tendon(s) is identified and retracted dorsally. The CMC joint capsule is incised transversely over the joint. A synovectomy and excision of osteophytes is performed and the joint is irrigated with 30–50 ml of normal saline in order to remove any remaining abrasive particles. The joint capsule is double-breasted with a monofilament polydioxanone suture (PDS II) in order to help reduction of the joint subluxation at least on the operating table. After wound closure and dressings, a plaster cast is applied for 2 weeks, followed by a splint for another 2 weeks. Postoperatively, no particular hand therapy is instituted. All operations were performed by two level IV surgeons (specialist - highly experienced) according to the grading of Tang.<sup>26</sup> The length of time (minutes) from skin incision to wound closure as well as intra- and post-operative complications were recorded.



**Figure 1** Drawing showing the nerve branches that are cut by the denervation of the thumb CMC-joint (1 superficial branch of the radial nerve; 1A dorsoradial digital nerve of the thumb; 1B dorsoulnar digital nerve of the thumb; 2 lateral antebrachial cutaneous nerve of the forearm; 3 palmar cutaneous branches of the median nerve).

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