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Original article

No correlation between severity of preoperative degenerative changes in the trapeziometacarpal joint and short-term clinical outcome after total joint arthroplasty

Aucune corrélation entre la gravité des modifications dégénératives sur les scanners préopératoires et le résultat clinique à court terme de l'arthroplastie totale de l'articulation trapézo-métacarpienne

Torben Bæk Hansen *, Lone Kirkeby

University clinic for hand, hip and knee surgery, Regional Hospital Holstebro, Aarhus University, Lægårdvej 12, 7500 Holstebro, Denmark

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Abstract

In this study, we wanted to investigate whether the severity of preoperative degenerative changes in the trapeziometacarpal (TM) joint seen on CT scans would influence the clinical outcomes after total TM joint arthroplasty, and particularly whether discrete degenerative changes in the scaphotrapezial (ST) joint would negatively affect the clinical outcome. Patients classified as Eaton–Glickel stage 2 or 3, as well as patients with Eaton–Glickel stage 4 disease who had discrete degenerative changes in the ST joint (i.e., narrowing and sclerotic changes but no osteophytes) were included in the study; patients with more severe degenerative changes of the ST joint were excluded. Follow-up was done using the Disability of Arm, Shoulder and Hand (DASH) score at 3, 6 and 12 months after surgery together with grip strength and pain using a 100-mm visual analog scale. In all, 59 patients with 69 total joint arthroplasties were included in the study; there were 47 females and 12 males with a mean age of 59 years (range 41–77). We found no significant difference between the three patient groups in their improvement in grip strength from preoperative to 12 months. Also we found no statistically significant differences in the DASH score or pain level at rest or during activity between the preoperative and all the postoperative time points. Total TM joint arthroplasty can produce excellent short-term clinical results with a good restoration of grip strength and function. Discrete degenerative changes in the ST joint appear not to be a contraindication for treating TM joint osteoarthritis with total joint arthroplasty.

Keywords: Osteoarthritis; Trapeziometacarpal joint; Thumb; Total joint arthroplasty; Eaton–Glickel classification; CT scan

Résumé

Dans cette étude, nous avons voulu vérifier si l'importance des modifications dégénératives de l'articulation trapézo-métacarpienne (TM) observées avant l'opération sur des scanners pouvait influencer le résultat clinique de l'arthroplastie totale de l'articulation TM, et surtout pour étudier si des modifications dégénératives discrètes de l'articulation scapho-trapézienne (ST) adjacente compromettaient le résultat clinique. Des patients classés aux stades II et III d'Eaton et Glickel ainsi que des patients au stade IV d'Eaton et Glickel montrant des modifications dégénératives discrètes de l'articulation ST adjacente sous forme de pincement de l'interligne et de sclérose sous-chondrale, mais pas d'ostéophytes, ont été inclus dans l'étude. Les patients avec des modifications dégénératives plus sévères de l'articulation ST ont été exclus. Le suivi a utilisé Disability of Arm, Shoulder and Hand (DASH) score à 3, 6 et 12 mois après la chirurgie, l'étude de la force de préhension et de la douleur, évaluée à l'aide d'une échelle visuelle analogique (EVA) continue graduée de 0 à 100 mm. Au total, 59 patients totalisant 69 arthroplasties 47 femmes et 12 hommes, 59 ans d'âge moyen (variant de 41 à 77 ans) ont été étudiés. Nous n'avons trouvé aucune différence significative dans les trois groupes d'Eaton et Glickel pour l'amélioration de la force de préhension de la période préopératoire à 12 mois suivant l'opération. Le score DASH et la douleur

* Corresponding author.
E-mail address: torbehns@rm.dk (T.B. Hansen).

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évaluée par l'EVA ne montraient aucune différence statistiquement significative au repos ou en activité de la période préopératoire à toute la période d'observation postopératoire. Cette étude ne montre aucune corrélation entre l'importance des modifications dégénératives sur les scanners préopératoires et le résultat clinique à court terme de l'arthroplastie totale TM.

Mots clés : Changements dégénératifs ; Articulation trapézo-métacarpienne ; Arthroplastie totale ; Classification d'Eaton et Glickel ; Tomodensitométrie

1. Introduction

Osteoarthritis of the thumb trapeziometacarpal (TM) joint is a common cause of pain and impaired function affecting as many as one third of post-menopausal women and one out of eight men [1]. In 1973, Eaton and Littler [2] described a classification system based on radiographic degeneration of the articular cartilage in the TM joint; this classification system was later modified by Eaton and Glickel [3] to include degenerative changes in the scaphotrapezial (ST) joint. Since it was published, the Eaton–Glickel classification system (Table 1) has been used widely to classify TM joint osteoarthritis and to plan surgical treatment. TM joint osteoarthritis has been treated with total joint arthroplasty with good short-term clinical results relative to trapeziectomy [4]. However, it has been hypothesized that degenerative changes in the ST joint may be the cause of poor results of total joint arthroplasty in TM arthritis due to persistent pain. A preoperative evaluation of the degenerative changes in the ST joint is typically made before performing total joint arthroplasty instead of trapeziectomy. Degenerative changes in the ST joint can be difficult to discern on plain radiographs of the TM joint [5,6]. Computed tomography (CT) can improve visualization and the preoperative evaluation and planning of surgical treatment [7], thereby making the classification more reliable (Fig. 1).

The aim of this study was to investigate whether the preoperative degenerative changes classified using the Eaton–Glickel classification would influence the clinical outcomes after total TM joint arthroplasty, and particularly whether discrete degenerative changes in the ST joint would negatively affect the clinical outcome.

Table 1
Radiological staging of TM osteoarthritis according to Eaton and Glickel [2].

Stage I	Articular contours are normal. There may be slight widening of the joint space because of effusion or laxity of the ligaments around the TM joint
Stage II	Slight narrowing of the TM joint. Minimal sclerotic changes of the subchondral bone. There may be joint debris not exceeding 2 mm in diameter in the form of osteophytes or loose bodies. The ST joint appears normal
Stage III	Joint space markedly narrowed or obliterated with cystic changes, sclerotic bone, varying degrees of dorsal subluxation. Joint debris exceeding 2 mm in diameter. The ST joint appears normal
Stage IV	Complete deterioration of the TM joint as in stage III and, in addition, the ST joint is narrowed with sclerotic and cystic changes apparent

TM: trapeziometacarpal; ST: scaphotrapezial.

2. Patients and methods

For many years, we have used plain radiographs combined with CT during routine preoperative examination before total TM joint arthroplasty to assess the severity of degenerative changes. For this study, we combined the radiological findings with prospectively collected data on pain, grip strength and self-evaluated hand function.

All patients operated between April 2008 and December 2010 for total TM joint arthroplasty were included in the study. Preoperative evaluation of the degenerative changes in the TM joint was classified by one observer according to the Eaton–Glickel classification using conventional radiographs (anterior-posterior and lateral views) and CT scans (horizontal and vertical scans with 2 mm slices).

Patients classified as Eaton–Glickel stage 2 or 3, as well as patients with Eaton–Glickel stage 4 showing discrete degenerative changes in the ST joint (i.e., joint narrowing and subchondral sclerotic changes but no osteophytes) were included in the study; patients with more severe degenerative changes of the ST joint were excluded and treated with a

Fig. 1. Computed tomography scans of a study patient who has degenerative changes in both the trapeziometacarpal and scaphotrapezial joints.