

Cortical contact is not necessary to prevent stem subsidence in
cementless trapeziometacarpal arthroplasty: A follow-up study

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DUERINCKX, Joris; Huijs, S.; CAEKEBEKE, Pieter; DRIESEN, Ronald & CORTEN, Kristoff (2022) Cortical contact is not necessary to prevent stem subsidence in cementless trapeziometacarpal arthroplasty: A follow-up study. In: Hand Surgery & Rehabilitation, 41 (6) , p. 707 -708.

DOI: 10.1016/j.hansur.2022.09.002

Handle: <http://hdl.handle.net/1942/39668>

Cortical contact is unnecessary to prevent stem subsidence in cementless trapeziometacarpal arthroplasty: follow-up study.

Le contact cortical n'est pas nécessaire pour prévenir l'affaissement de la tige dans l'arthroplastie trapézométacarpienne sans ciment : l'étude de suivi.

Dear Sir,

We previously reported that impacted cancellous bone can provide adequate stability for uncemented stems in the thumb metacarpal [1]. We based our conclusion on the fact that we did not observe radiographic subsidence at one year postoperatively in a series of 87 Maïa prostheses. In 77% of the cases the stem was implanted without cortical bone contact on posteroanterior (PA) and lateral radiographic views. We reassessed the same patient group after a mean follow-up period of 6,1 years (range 2 – 10). 57 patients (75%) could be recruited, representing 66 implants (76%). Three patients had deceased and two implants were removed because of trapezium fracture and infection. Similar to the previous study, stem position was expressed as the ratio between the length of the metacarpal and the distance between the proximal end of the stem and the distal articular surface of the thumb metacarpal. Subsidence was determined by comparing stem position immediately after surgery and at last follow-up. Linear mixed models were used to obtain the mean and 95% confidence intervals for (1) stem position immediately after surgery, (2) stem position at final follow up, and (3) the change in stem position over time. On posteroanterior radiographs, the mean ratio immediately postoperatively was 1,414 (95% CI 1,390; 1,438) and at follow-up 1,420 (95% CI 1,390; 1,450). On average, this number decreased by 0,007 (95% CI - 0,009; 0,024) at follow-up. This was not statistically significant ($P = 0,3871$). On lateral

radiographs, the ratio immediately postoperatively was 1,397 (95% CI 1,374; 1,420) and at follow-up 1,406 (95% CI 1,383; 1,428). The mean difference between both time points was 0,008 (95% CI -0,0003; 0,016) and not significant ($P = 0,060$).

The present study confirms that impacted cancellous bone can provide adequate primary stability to allow secondary bone ongrowth. However, other radiographic findings were observed. Minor heterotopic ossifications were present in most cases. One patient had a unilateral radiolucent line at the stem-bone interface with no other signs of loosening. Similar findings were described in another series with more than 6 years follow-up [2], also without evidence of metacarpal loosening or sinking of the stem.

In 16% of our cases there was cortical stem contact on both PA and lateral views at level of the isthmus. We did not observe stress-shielding as predicted by Ledoux in a finite element analysis study [3]. In two implants without cortical bone contact, there was endosteal bone formation between the tip of the stem and the inner cortex of the metacarpal (Fig. 1). This represents prosthesis-to-bone stress transfer away from the metaphyseal part of the implant and has not been described yet in trapeziometacarpal total joint replacement. The clinical significance of these bone reactions remains unclear and warrant longer-term follow-up.

Acknowledgements

We would like to thank Ms Liesbeth Bruckers, consulting coordinator of I-Biostat (Interuniversity Institute for Biostatistics and statistical Bioinformatics) for her help with the statistics of this study.

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61 Figure legends

62 Figure 1. Radiographic evaluation ten years after Maïa trapeziometacarpal total joint
63 arthroplasty. Slight oblique positioning of the stem. No signs of loosening. Unilateral
64 endosteal bone formation between the tip of the stem and the inner cortex of the
65 metacarpal (°). Minor heterotopic ossification and stem overgrowth at the metacarpal
66 base (*).