CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Touch thumb arthroplasty

Overview

- The Elektra prosthesis for trapeziometacarpal osteoarthritis demonstrated fast pain relief, maintenance of mobility, and a gradual increase in grip strength [1].
- The Elektra prosthesis for trapeziometacarpal osteoarthritis had a revision rate of 44% after 72 months [1].
- Trapeziometacarpal prosthesis enhances function, thumb length, and patient recovery in TMC arthrosis [2].
- Limiting the magnitude of thumb loads after arthroplasty may contribute positively to the longevity of the procedure [3].
- The Touch® trapeziometacarpal joint arthroplasty has a 96% implant survival rate at 2 years [4].
- The Touch® trapeziometacarpal joint arthroplasty is recommended as the standard treatment for patients with isolated trapeziometacarpal joint osteoarthritis [4].
- The MOOVIS prosthesis is recommended for the treatment of advanced trapeziometacarpal osteoarthritis in people having an activity without too many manual constraints due to the absence of prosthesis instability [5].
- The Elektra prosthesis for trapeziometacarpal osteoarthritis showed poor outcomes after 2 years, leading authors to not recommend this implant [6].
- Total joint arthroplasty in primary trapeziometacarpal joint arthritis results in low pain levels, excellent mobility, clinical function, and high patient satisfaction [7].
- The MAÏA trapeziometacarpal prosthesis represents a long-term solution for surgical treatment of thumb rhizarthrosis [8].
- MAÏA TMC total joint arthroplasty provides very good results for pain relief, strength, mobility, and restoration of the thumb length [10].
- MAÏA TMC total joint arthroplasty provides correction of most thumb z-deformities [10].

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Anatomy & Pathophysiology

BONY ANATOMY & JOINT MECHANICS

- The thumb metacarpal is independent and articulates with the trapezium [26].
- The thumb ray is the most divergent of the five rays of the hand [26].
- The thumb has a more proximal and lateral position than the four fingers, allowing movement inward and outward from the palm [21].
- The web space of the thumb is the largest and deepest of the hand [21].
- The thumb is described as the master digit of the hand, representing the dominant element that gives value to all other digits [26].
- The hand consists of 19 bones, 17 articulations, and 19 muscles situated entirely within the hand [21].

PROSTHESIS DESIGN & BIOMECHANICS

- The Touch® prosthesis reproduces the concept of dual mobility consisting of a mobile prosthetic head in a polyethylene insert that is freely moveable within a metal cup [13].
- The Touch® prosthesis comprises two concentric articulations: a smaller articulation between the head and polyethylene insert, and a larger articulation between the polyethylene insert and metal cup [13].
- The Touch® prosthesis utilizes metal-on-polyethylene bearings [13].
- The Touch® prosthesis is modular, composed of a titanium alloy stem (Ti–6Al–4 V), an M30 stainless steel intermediate implant, and an M30 stainless steel hemispheric cup [13].
- The Touch® prosthesis head is covered by a pre-assembled high-density 7-mm diameter polyethylene insert [13].
- Implant fixation for the Touch® prosthesis is achieved by a press-fit effect and a double-layer porous titanium and hydroxyapatite coating that promotes osteointegration [13].
- The total in vitro range of motion of the Touch® prosthesis is 117 degrees [13].

PATHOPHYSIOLOGY & COMPLICATIONS

- Aseptic cup loosening is cited as the most common reason for implant failure in thumb carpometacarpal joint replacement, leading to revision rates of 42%–51% [15].
- Proximal migration of the thumb is a major drawback of resection-suspension arthroplasty that can lead to compromised pinch strength and disability [15].
- Polyethylene liner fracture in the Touch prosthesis can present as persistent clicking during thumb motion without antecedent trauma or pain [11].
- Standard radiographs and CT scans may show a well-aligned implant without evidence of loosening in cases of polyethylene liner fracture [11].

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- Stress-view imaging (dynamic x-ray) using a fluoroscopic image intensifier can reveal instability of the carpometacarpal I joint and decentralization of the head compared with the cup in cases of polyethylene liner fracture [11].
- Dynamic radiographic imaging with longitudinal traction is important for making a timely diagnosis of polyethylene liner fracture when standard radiographs are normal [14].
- Revision surgery for polyethylene liner fracture involves exchanging only the liner, which restores stability [11].

Classification

- The Touch® prosthesis reproduces the original concept of dual mobility as defined by Gilles Bousquet for a total hip prosthesis [13].
- The Touch® prosthesis consists of a mobile prosthetic head in a polyethylene insert that is freely moveable within a metal cup [13].
- The Touch® prosthesis was developed in 2013 based on the principle of a ball-and-socket joint with three degrees of freedom [13].
- The Touch® prosthesis is modular and composed of a titanium alloy stem (Ti–6Al–4 V) available in five sizes [13].
- The Touch® prosthesis includes an M30 stainless steel intermediate implant with a 4-mm diameter head covered by a pre-assembled high-density 7-mm diameter polyethylene insert [13].
- The Touch® prosthesis polyethylene insert is available in three lengths and two angles [13].
- The Touch® prosthesis includes an M30 stainless steel hemispheric cup available in two sizes (9 and 10 mm in diameter) [13].
- Implant fixation for the Touch® prosthesis is primary by a press-fit effect and secondary by means of a double-layer porous titanium and hydroxyapatite coating [13].
- The double-layer porous titanium and hydroxyapatite coating promotes and accelerates osteointegration [13].
- The total in vitro range of motion of the Touch® prosthesis is 117° [13].

Clinical Presentation

- Persistent clicking during thumb motion without antecedent trauma or pain can be a clinical sign of polyethylene liner fracture in a Touch prosthesis [11].
- Grip and pinch strength may remain clinically unchanged compared with the contralateral side despite the presence of a fractured polyethylene liner [11].
- Standard radiographs may appear normal in cases of polyethylene liner fracture, failing to reveal the diagnosis [14].

- Computed tomography (CT) scans may demonstrate a well-aligned implant without evidence of loosening even when a polyethylene liner fracture is present [11].
- Stress-view imaging using a fluoroscopic image intensifier can reveal instability of the carpometacarpal I joint during the application of translatory stress forces on the thumb [11].
- Stress-view imaging may show a hint of possible decentralization of the prosthetic head compared with the cup in cases of polyethylene liner fracture [11].

Investigations

- A careful physical examination is essential to direct care and future testing if indicated [17].

Treatment

PROSTHETIC DESIGN AND MECHANICS

- The Touch® prosthesis cup is available in two sizes: 9 and 10 mm in diameter [13].
- Implant fixation for the Touch® prosthesis is primary by a press-fit effect and secondary by a double-layer porous titanium and hydroxyapatite coating [13].

CLINICAL OUTCOMES AND SURVIVAL

- Trapeziometacarpal prosthesis enhances function, thumb length, and patient recovery [2].
- Total joint arthroplasty in primary trapeziometacarpal joint arthritis results in low pain levels, excellent mobility and clinical function with high patient satisfaction [7].
- The Elektra prosthesis for trapeziometacarpal osteoarthritis has a revision rate of 44% after 72 months [1].
- The Elektra prosthesis for trapeziometacarpal osteoarthritis is not recommended due to poor outcomes after only 2 years [6].
- MAÏA TMC joint prosthesis is a reliable long-term surgical procedure for TMC joint osteoarthritis, improving overall function beyond 10 years [19].
- The Moovis prosthesis is recommended for the treatment of advanced trapeziometacarpal osteoarthritis for people having an activity without too many manual constraints [5].

COMPLICATIONS AND TECHNICAL CONSIDERATIONS

- A fracture of the polyethylene liner in a Touch trapeziometacarpal prosthesis can present as persistent clicking during thumb motion without antecedent trauma or pain [11].
- Stress-view imaging using a fluoroscopic image intensifier can reveal instability of the carpometacarpal I joint and possible decentralization of the head compared with the cup in cases of suspected polyethylene liner fracture [11].
- Exchanging only the polyethylene liner restores stability after a liner fracture in a Touch prosthesis [11].

- Correct implant position can lead to reliable medium-term results after trapeziometacarpal joint arthroplasty with unconstrained cups [9].
- Attentive reaming of the trapezium and careful cup impaction are crucial steps to avoid trapezial fracture and early cup failure in Moovis arthroplasty [12].
- Scaphometacarpal arthroplasty using a trapeziometacarpal prosthesis is not sufficiently reliable to be a routine solution for surgical revision of failed TMC arthroplasty or trapeziectomy [16].
- Scaphometacarpal arthroplasty using a trapeziometacarpal prosthesis should be used with caution, primarily as a salvage solution if no safer alternative is available [16].
- Aseptic cup loosening is the most common reason for implant failure in replacement arthroplasty, leading to revision rates of 42%–51% [15].

Complications

POLYETHYLENE LINER FRACTURE

- A 53-year-old male professional cook developed persistent clicking during thumb motion 12 months after Touch trapeziometacarpal arthroplasty for primary osteoarthritis [11].
- Standard radiographs and CT scans in a patient with suspected polyethylene liner fracture may show a well-aligned implant without evidence of loosening [11].
- Stress-view imaging using a fluoroscopic image intensifier can reveal instability of the carpometacarpal I joint and possible decentralization of the head compared with the cup when standard radiographs are normal [11].
- Revision surgery for a suspected polyethylene liner fracture may confirm a fractured PE liner with an intact metallic head and stem [11].
- Exchanging only the polyethylene liner can restore stability in cases of Touch prosthesis liner fracture [11].

IMPLANT SURVIVAL AND REVISION

- The Elektra prosthesis for trapeziometacarpal osteoarthritis had a revision rate of 44% after 72 months in a follow-up of 39 consecutive cases [1].
- The Touch trapeziometacarpal joint arthroplasty reported a 96% implant survival rate at 2 years [4].
- Aseptic cup loosening is cited as the most common reason for implant failure in thumb carpometacarpal replacement arthroplasty, leading to revision rates of 42%–51% [15].

OPERATIVE COMPLICATIONS AND TECHNICAL CONSIDERATIONS

- Attentive reaming of the trapezium and careful cup impaction are crucial steps to avoid trapezial fracture and early cup failure in Moovis trapeziometacarpal joint arthroplasty [12].

Recovery

- Attentive reaming of the trapezium and careful cup impaction are crucial steps to avoid trapezial fracture and early cup failure [12].
- Correct implant position can lead to reliable medium-term results after trapeziometacarpal joint arthroplasty [9].
- Exchanging only the liner restores stability following a polyethylene liner fracture in a Touch trapeziometacarpal prosthesis [11].

Key Evidence

- [L4] Although the study observed fast pain relief, maintenance of mobility, and a gradual increase in grip strength, there was an increasing need for revision with a rate of 44% after 72 months. [1] (10.1177/1753193412443501)
- [L3] Trapeziometacarpal prosthesis shows promise for TMC arthrosis, enhancing function, thumb length, and patient recovery, warranting further research and x-ray guidance. [2] (10.1016/j.jhsg.2024.03.004)
- [L5] Limiting the magnitude of thumb loads after arthroplasty may contribute positively to the longevity of this procedure. [3] (10.1177/1753193416659230)
- [L4] The study reports a 96% implant survival rate at 2 years with promising patient-reported and clinical outcomes, leading the authors to recommend surgery with the TouchRV prosthesis as the standard treatment for patients with isolated trapeziometacarpal joint osteoarthritis. [4] (10.1177/17531934231179581)
- [L4] The absence of prosthesis instability encourages us to recommend this technique for the treatment of advanced trapeziometacarpal osteoarthritis for people having an activity without too many manual constraints. [5] (10.1177/1558944718797341)
- [L3] Because of these poor outcomes after only 2 years, the authors cannot recommend this implant. [6] (10.1177/1753193411414505)
- [L3] Total joint arthroplasty in primary trapeziometacarpal joint arthritis results in low pain levels, excellent mobility and clinical function with high patient satisfaction. [7] (10.1186/s12891-024-07439-5)
- [L4] The MAÏA trapeziometacarpal prosthesis represents a long-term solution for surgical treatment of thumb rhizarthrosis. [8] (10.1177/17531934221136442)
- [L4] This study shows that correct implant position can lead to reliable medium-term results after trapeziometacarpal joint arthroplasty. [9] (10.1177/1753193417741237)
- [L4] MAÏA TMC total joint arthroplasty may be a reliable treatment option for TMC joint osteoarthritis, with very good results for pain relief, strength, mobility, and restoration of the thumb length, providing correction of most thumb z-deformities. [10] (10.1016/j.jhsa.2017.06.008)

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- [L5] [11] (10.1016/j.jhsg.2026.101045)
- [L2] Attentive reaming of the trapezium and careful cup impaction are crucial steps to avoid trapezial fracture and early cup failure. [12] (10.1177/1753193420921307)
- [L4] [13] (10.1177/17531934211024500)
- [L4] This case highlights the importance of dynamic radiographic imaging with longitudinal traction to make a timely diagnosis of polyethylene liner fracture when standard radiographs are normal. [14] (10.1177/17531934241227918)
- [L3] [15] (10.1177/1753193419873230)
- [L5] Scaphometacarpal arthroplasty using a trapeziometacarpal prosthesis is not sufficiently reliable to be a routine solution for surgical revision of failed TMC arthroplasty or trapeziectomy; instead, it should be used with caution, primarily as a salvage solution if no safer alternative is available. [16] (10.1177/17531934231201914)
- [L4] MAÏA TMC joint prosthesis is a reliable long-term surgical procedure for TMC joint osteoarthritis, improving overall function beyond 10 years. [19] (10.1016/j.jhsa.2024.03.019)

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