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Medium-term outcomes and complications after total replacement of the temporomandibular joint. Prospective outcome analysis after 3 and 5 years

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Abstract

In this prospective analysis, we assess the medium-term benefits, efficacy, and safety of the TMJ Concepts joint replacement system in the United Kingdom. Outcome measures of pain, maximum mouth opening, and diet were recorded preoperatively and at intervals up to 3 and 5 years. All patients who had replacement temporomandibular joints (TMJ) within a 6-year period were included. A total of 58 patients (84 joints) were followed up for 3 years (mean age 47, range 19–72) and 26 (42 joints) for 5 years (mean age 46, range 27–70). The female to male ratio was 52:6 at 3 years and 23:3 at 5 years. The most common diagnosis was degenerative disease, and the mean number of previous TMJ procedures was 2.4 (range 0–14). There were significant improvements in pain scores (7.4 reduced to 0.6 at 3 years and 0.8 at 5 years), maximum mouth opening (21.0–35.5 mm at 3 years and 23.8–33.7 mm at 5 years), and dietary scores (4.1–9.7 at 3 years and 3.7–9.6 at 5 years). Revision operations were required in 2 patients (not included in the outcome data) for biofilm infection of the prosthesis secondary to local infection in the head and neck. One patient had weakness of the temporal branch of the facial nerve that needed correction. TMJ replacement is an effective form of management for an irreparably damaged joint, particularly in cases of ankylosis. It lessens pain and improves function with minimal long-term morbidity.

Keywords: TMJ replacement; Patient-fitted prosthesis; Degenerative arthritis; Rheumatoid arthritis; TMJ ankylosis; Revision arthroplasty

Introduction

Operations on the temporomandibular joint (TMJ) should be considered only when an appropriate diagnosis has been made and conservative measures have failed, and total alloplastic joint replacement is the final stage in the management of TMJ disorders.[1] Guidelines for replacement in the United Kingdom (UK) are more stringent than those for the total replacement of orthopaedic joints.[2] Diseases that involve loss of condylar bone should be diagnosed by computed tomography (CT) or magnetic resonance imaging (MRI) as a minimum, and patients must meet specific clinical criteria in relation to function and quality of life to meet National Institute for Health and Care Excellence (NICE) guidelines.[3] Total replacement is now the gold standard treatment for collapsed, irreparably damaged, or ankylosed joints. Fig. 1 shows intraoperative findings in a patient with ankylosis, and Fig. 2 shows the new joint in place.

Three prostheses have previously been used in the UK: TMJ Concepts (Ventura, USA), Biomet (Biomet 3i UK Ltd, Maidenhead, UK), and Christensen, now TMJ Medical (Salt Lake City, USA). The TMJ Concepts (formerly Techmedica) patient-fitted total TMJ reconstruction system is custom-made with a titanium body and cobalt-

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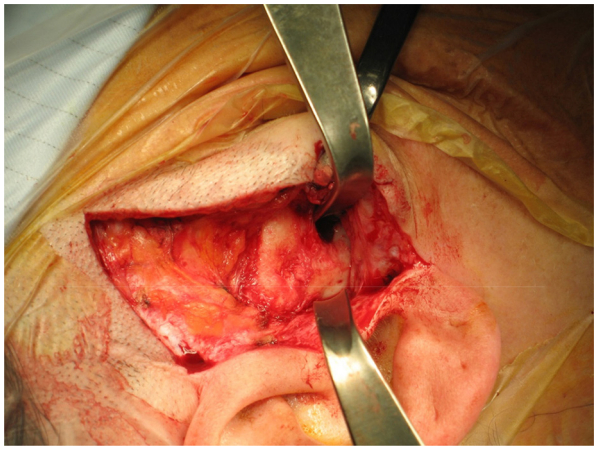

Fig. 1. Intraoperative photograph of patient with ankylosis of the TMJ.

chromium-molybdenum condylar head on an ultra-high-molecular-weight polyethylene (UHMWPE) fossa articulating surface. It is constructed using a CAD-CAM model from a 3-dimensional CT scan. The condylar head component may be made of hardened titanium for patients with an allergy to cobalt-chromium alloy.[4]

The TMJ Concepts prosthesis has shown good long-term outcomes[5,6] with up to 17 years follow-up in the United States (US) and success of 90%, but little long-term experience has been reported in the UK. NICE guidance (2009) suggests that research is needed to ensure that efficacy and safety outcomes in the UK match those in the US.[3] We prospectively reviewed the medium-term outcomes from 2004 onwards for total TMJ replacements by a single surgeon in the UK. The key efficacy outcomes suggested in the NICE guidance are pain relief, improved mouth opening, and the ability to eat a normal diet.[3] We also compared medium-term complications with the short-term complications discussed in the one-year outcome study.[7]

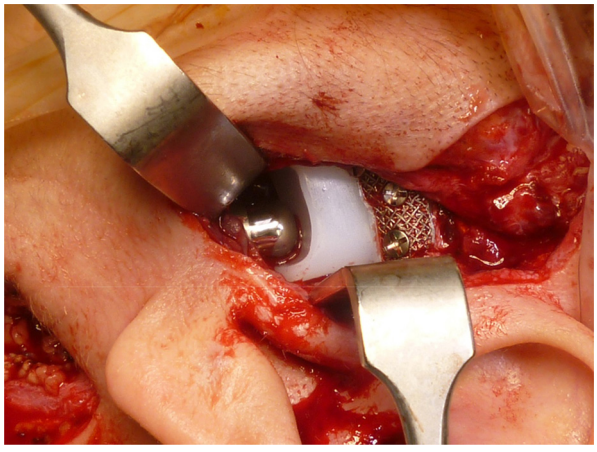

Fig. 2. Intraoperative view of TMJ Concepts prosthesis in place.

Table 1
Number of patients and operated joints.

	3-year follow-up	5-year follow-up
No. of patients	58	26
Operated joints		
Total	84	42
Bilateral	26	16
Right	12	2
Left	20	8
Female:male ratio	52:6	23:3
Mean age (range) (years)	47 (19–72)	46 (27–70)

Methods

All patients who had the TMJ replaced by the senior author between 2004 and 2009 were included in the study. Patients were fitted with custom-made TMJ Concepts prostheses, either unilaterally or bilaterally. Disease was diagnosed on CT and confirmed histopathologically.

Pain scores were recorded for each side separately using a 10 cm visual analogue scale (VAS) from 0 (no pain) to 10 (worst pain imaginable). Only the operated side was included in the outcome analysis. Maximum mouth opening in millimetres was measured between the upper and lower incisal edges (or edges of dentures) using callipers. Dietary scores were recorded using a 10 cm VAS from 0 (liquids only) to 10 (no interference with normal diet) preoperatively, and postoperatively at 12 months, then yearly. The results were analysed at each time point, and mean (SD) values calculated. Paired *t* tests were used to assess outcomes, and probabilities of less than <0.05 were considered significant.

Results

The results are shown in Tables 1–4. The most common diagnosis was degenerative disease. A total of 58 patients (84 joints) were followed up for 3 years and 26 (42 joints) for 5 years. The mean number of previous operations on the joint was 2.4 (range 0–14).

Pain scores were reduced at one year after operation and this was maintained at 3-year and 5-year follow-up. Maximum mouth opening increased significantly at one-year follow-up and again was stable at 3 and 5 years.

Table 2
Preoperative diagnoses.

Diagnosis	No. of patients
Degenerative disease	15
Post trauma	11
Revision cases (various causes)	8
Rheumatoid arthritis	7
Ankylosis (various causes)	6
After several operations	6
Psoriatic arthritis	4
Ankylosing spondylitis	1