

20-Year Follow-Up Study of Disc Repositioning Surgery for Temporomandibular Joint Internal Derangement

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Purpose: The purpose of this study was to assess the outcomes of temporomandibular joint (TMJ) disc repositioning as a surgical treatment for TMJ internal derangement (ID).

Materials and Methods: By retrospective chart review, all patients who had TMJ disc repositioning for treatment of TMJ ID from 1984 to 1990 were identified. Attempts were made to locate these patients, and they were sent a TMJ questionnaire. The questionnaire provided subjective (pain and diet consistency) and objective (mandibular function) data.

Results: The chart review yielded 153 patients. Complete TMJ questionnaires were obtained from 18 patients (36 joints). Analysis of data showed a reduction in pain scores, an improvement in diet consistency, and an increase in mandibular range of motion. The majority (94%) reported an improvement in quality of life.

Conclusions: Outcome data presented show that TMJ disc repositioning is an effective and successful surgical treatment for TMJ ID. This success has been maintained for 20 years in this specific patient population.

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J Oral Maxillofac Surg 68:239-242, 2010

In 1979, McCarty and Farrar¹ first described a technique for disc repositioning as a treatment for temporomandibular joint (TMJ) internal derangement (ID). They reported a 94% success rate during a 6-year period. Subsequent studies have reported variations in the technique, with success rates ranging from 82% to 94% with an average follow-up ranging from 11 months to 8 years.²⁻⁷

Regardless of these high success rates, surgeons felt that the success was short-lived and long-term results were not high. To demonstrate the long-term stability

of disc repositioning as a treatment for TMJ ID, Dolwick and Nitzan⁸ published a study in 1990 that showed a 70% to 80% improvement in symptoms after surgery. These data indicated that the improvement was maintained for the 8-year evaluation period and was not simply a short-term improvement, possibly related to the anesthesia of the auriculotemporal nerve.^{8,9} Since then, the literature is lacking in long-term outcome studies of disc repositioning for the management of TMJ ID.

Furthermore, the high success rates and low morbidity of conservative interventions such as arthrocentesis and arthroscopy for the treatment of TMJ ID have led to a decrease in the frequency of open TMJ surgical procedures. If conservative management, however, is unsuccessful, a need remains for surgical options.

The purpose of this study is to report the 20-year follow-up outcomes of TMJ disc repositioning as a surgical treatment for TMJ ID.

Materials and Methods

A retrospective chart review (UF IRB #2006-388) was conducted of patients who had TMJ disc repositioning

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0278-2391/10/6802-0002\$36.00/0
doi:10.1016/j.joms.2009.09.051

tioning for treatment of TMJ ID from 1984 to 1990 at the Department of Oral and Maxillofacial Surgery, University of Florida College of Dentistry in Gainesville. Patients were symptomatic for longer than 5 years and improvement without surgical intervention was unlikely. All surgeries were performed by the same primary surgeon (M.F.D.) who operated using similar surgical techniques. All patients received the same postoperative care and rehabilitation.

To find the current location of these patients, available demographic information and national search engines were used. The patients were then contacted by telephone and were asked for permission to send them a standardized TMJ questionnaire (Fig 1) by mail. This was the same questionnaire that they completed before the surgical intervention. This 1-page TMJ questionnaire, a metric ruler, instructions for completing the questionnaire and using the metric ruler, and a stamped, self-addressed return envelope were mailed to the patients.

This TMJ questionnaire consisted of the same questions as the questionnaire that was completed by the patient before the surgical intervention in the 1980s. Specifically, it directed the patient to assess the current TMJ status by reporting overall pain level, pain

level during function, functional limitations, sleep disturbances, perception of mandibular function, diet consistency and limitations, and current quality of life. Patients were also asked to report additional TMJ surgeries. Maximal incisal opening was measured by the patient using the enclosed metric ruler and reported in the TMJ questionnaire.

Results

Chart review yielded 153 patients. Significant challenges were met when attempting to locate these patients for a variety of reasons: out-of-state relocation, name changes secondary to marriage or divorce, illness, or death. Regardless, 18 patients (11.8%) were located, contacted, and were sent the questionnaires. All were returned complete and valid. Of the surveys returned, 16 respondents were female and 2 were male. This represented 36 joints (all were bilateral) with a mean follow-up of 20 years (range, 18 to 22 years).

Analysis of data showed a current average of 1.3/10 joint pain at rest (range, 0 to 10/10) compared with 9/10 (range, 8 to 10/10) before surgery. This shows an overall 77% reduction in TMJ pain at rest. An improvement in pain during mandibular function was reported in 56% of patients. Although 8 patients (44%) reported current dietary restrictions, the restrictions included chewing gum, eating hard vegetables, and eating nuts, all foods that the patients reported being able to avoid as needed. Of all respondents, 17 patients (94%) reported an improvement in overall quality of life (diet limitations, pain, and function limitations) and 1 patient reported that her quality of life was unchanged. No patient reported a worsening in quality of life.

Analysis of objective data showed an improvement in mandibular range of motion with a current average maximal incisal opening of 35.9 mm (range, 22 to 52 mm). Nine patients (50%) currently continue to use an occlusal bite splint. One patient required bilateral TMJ discectomies and orthognathic surgery 11 years after the initial surgery. This was a result of an acquired malocclusion caused by facial trauma that she sustained during a motor vehicle collision. All 17 other patients did not undergo another TMJ operation (Fig 2).

Discussion

This 20-year follow-up study demonstrates the difficulties in performing long-term studies. In general, locating patients is difficult because patients may have died, relocated, or had name changes secondary to marriage or divorce. Specifically in this study, the 18 patients who were included were the only ones who

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TMJ questionnaire

Please circle the correct response where indicated:

1. Do you have any pain now? Yes or No
If yes, please answer questions 2 and 3.
Otherwise please go directly to question 4.
2. Please rate your pain 0 ————— 10
(by marking an X) no pain at all worst pain ever
3. Please indicate on the drawing the areas where you are currently having pain

Right



Left


4. Are you awakened from sleep with pain? Yes or No
5. Are you aware of clenching or grinding of your teeth? Yes or No
6. Is the pain worse when functioning (chewing, talking)? Yes or No
7. Do you have limited mouth opening? Yes or No
Please use the attached ruler to measure your mouth opening from biting edge of top teeth to biting edge of bottom teeth. _____ cm
8. Do you have any dietary limitations related to jaw problems? Yes or No
9. Does your jaw make noises when functioning? Yes or No
10. Have you experienced jaw locking since you were last treated? Yes or No
11. How do you feel now compared to the time you were treated?
worse ————— same ————— better
12. Have you sought other care for your TMJ problems? Yes or No
If yes, please describe.
13. Have you had additional surgeries to your TMJ? Yes or No

FIGURE 1. TMJ questionnaire.

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	Max Incisal Opening (mm)	Current level of joint pain (0-10)	Pain compared to preop (B/same/worse)	Additional TMJ surgeries (Y/N)	Pain during function (Y/N)	Functional/dietary limitations (Y/N)	Clenching or grinding (Y/N)
1	52	Y (4)	Better	N	Y	Y	Y
2	22	Y (1)	Better	N	Y	Y	Y
3	30	Y (4)	Better	N	Y	Y	Y
4	33	Y (7)	Better	N	N	N	N
5	50	N	Better	N	N	N	N
6	40	N	Better	N	Y	Y	Y
7	40	N	Better	N	N	N	N
8	30	Y (2)	Better	N	Y	Y	Y
9	30	N	Better	N	Y	Y	N
10	35	N	Better	Y	N	N	N
11	28	Y (3)	Same	N	Y	Y	Y
12	35	Y (3)	Better	N	Y	N	N
13	25	N	Better	N	N	N	N
14	40	N	Better	N	N	N	N
15	35	N	Better	N	N	Y	Y
16	35	N	Better	N	N	N	Y
17	41	N	Better	N	N	N	Y
18	45	N	Better	N	N	N	N
T	Avg 35.9	Avg 1.3	17B 1S	17N 1Y	8Y 10N	8Y 10N	9Y 9N

FIGURE 2. Summary of results.

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could be located. They were in distant locations such as Ohio, Michigan, and California.

Although it would be ideal to examine these patients clinically and radiographically, previously mentioned difficulties were encountered. We were unable to clinically and radiographically record complications such as condylar resorption and bony ankylosis. Therefore, we had to rely on individual patient reports of current condition. Joint stability was reported in 17 patients. One patient was involved in a motor vehicle collision and sustained head trauma. She then required bilateral discectomies and developed a malocclusion, necessitating orthognathic surgery.

In 1990, Dolwick and Nitzan⁹ reported that about 90% of the patients reported a 70% to 80% improvement after the surgery and that the improvement was maintained for the 5 years evaluated. The present study shows similar results with an overall 77% reduction in TMJ pain at rest, or an average of 1.3/10 on the pain scale. The fact that half of the patients are still using bite splints 20 years after disc repositioning surgery does not indicate surgical failure. Rather, the need for occlusal appliance postoperatively demonstrates the need for continuing conservative nonsurgical management of a possible underlying etiologic factor of joint overloading and parafunctional habits. The data presented show that 20 years after disc repositioning surgery for TMJ ID, the patients are still doing well with a significant improvement in quality of life and that the results remain stable for the 20 years reported.

One of the most important indicators of successful disc repositioning is careful patient selection. Patients who have a muscular component to their pain must

have the muscular component controlled by pharmacologic means, stress reduction, or a bite splint. The muscular component must be stabilized before embarking on this invasive surgical intervention to increase the likelihood of success of disc repositioning.¹⁰ Furthermore, if a patient presents with diffuse head and face pain that is not localized to the TMJ, the surgeon must carefully evaluate the factors leading to such complaints to ensure that indeed isolated TMJ dysfunction is the culprit. Often, there is a spontaneous improvement in symptoms associated with TMJ ID. The more localized the symptoms are to the TMJ, the better the surgical result. In contrast, the more diffuse the symptoms, the poorer the result.¹¹

Once the patient is taken to surgery, the surgeon must carefully evaluate the joint intraoperatively before repositioning the disc. The disc should have a healthy and normal appearance and be firm, white, shiny, smooth, and without perforations or pathology. If the disc is perforated or deformed, it should be removed rather than repositioned.¹² Next, the surgeon must ensure that the disc can be easily repositioned and without tension. This should be done while keeping in mind that the goal is the elimination of mechanical interference to allow smooth movement and not necessarily the return of the disc to a normal position.^{12,13} A patient may be asymptomatic, although the disc may not be in its normal position. If the disc does not have a free and loose range of motion or it does not freely reduce to rest over the superior portion of the condyle, disc repositioning should be abandoned.^{12,13}

Although a few previous reports have described poor outcomes, they may have been a result of unre-

alistic patient expectations and unclear surgeon expectations. For TMJ disc repositioning surgery, and in fact, for all TMJ surgery, it is important that the surgeon and the patient have realistic expectations for the outcomes. It is unrealistic to expect that any TMJ surgery will completely eliminate all signs and symptoms or completely restore normal TMJ function. As demonstrated in this study, TMJ disc repositioning is considered successful if there is an increase in a patient's range of motion, significant reduction in joint pain, and improvement in quality of life. Furthermore, it is important to note that improvement in symptoms may reflect the natural history of internal derangement and improvement in symptoms regardless of surgical intervention.

This study adds to previously reported successful results^{8,9} and encourages the surgeon to pursue the technique of disc repositioning for a patient with the proper indications. Outcome data presented show that TMJ disc repositioning is an effective and successful surgical treatment for TMJ ID in the specific patient population surveyed. This study shows that the reduction in pain and the improvement in TMJ function were maintained for the 20-year evaluation period.

In conclusion, TMJ disc repositioning is an effective and successful surgical treatment for TMJ ID in the specific patient population surveyed. This success has been maintained for 20 years. Keys to success are careful patient selection, intraoperative evaluation of the disc and bony anatomy, and appropriate postsur-

gical management to control adverse loading of the TMJ.

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