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RESEARCH ARTICLE

NON SURGICAL MANAGEMENT OF TEMPOROMANDIBULAR JOINT HYPERMOBILITY BY PROLOTHERAPY- A CASE REPORT

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ABSTRACT

The Temporomandibular joint (TMJ) Hypermobility is very unpleasant and distressing condition, which causes hypertranslation of the mandibular condyle anterior and superior to the articular eminence during mouth opening. It can be classified according to its reduction as subluxation or dislocation. In recent times, various treatment modalities are available for its management. Surgery is considered as a last resort for TMJ Hypermobilty but recent recognition of its failures has developed the interest and research in 'Prolotherapy' (PrT). PrT has been used for treating ligamentous laxity and related musculoskeletal conditions. **Objective:** This study was conducted on a 25 years old male patient to check whether the PrT therapy is effective in treating the TMJ hypermobility. **Method:** 1 ml solution of 25% Dextrose was injected around the Left TMJ area for 2 sessions at a interval of 2 week and patient was recalled for regular follow-up. **Results:** The patient was evaluated at each follow-up for subjective symptoms like mouth opening, frequency of locking episode, Visual Analogue Scale for Quality of life and pain on function, chewing efficiency and for clicking sound, on follow–up it was found that the subjective symptoms improved within short period of time. **Conclusion:** The results of this case report show that PrT can be used as an efficient, simple, and conservative method to treat TMJ Hypermobility.

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INTRODUCTION

Hypermobility of the temporomandibular joint (TMJ) aroused the interest of oral and maxillofacial surgeons long ago, and surgical and conservative treatment continues to play a limited but useful role in the management of patients with this condition. The temporomandibular joint (TMJ) is formed between the mandibular recess, the articular protrusion of the temporal bone and the condyle of the mandible. The TMJ is a group of synovial and movable joints (Cascone et al., 2008 and Aaron Liddell, 2015). The TMJ is associated with certain movements, such as protraction (sliding of the mandible head to the front), retraction (sliding of the mandible head to the back), elevation (closing of the jaw), depression (opening of the jaw) and lateralization (Aaron Liddell, 2015). TMJ hypermobility could be classified according to its reduction as subluxation or dislocation.

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TMJ subluxation is a condition where the condyle translates anterior to its normal range and the patient exhibits a momentary inability to close the mouth from a maximally open position (temporary locking sensation) that either abates spontaneously or can be reduced with manual self-manipulation (Ramazan Kahveci, 2012 and Adekeye, 1976). When it is asymptomatic, it should be viewed as a variant of normal. TMJ dislocation (luxation) occurs when the condyle moves outside the glenoid fossa, locking anteriorly to the articular eminence, where it cannot be self-reduced. This locking action is maintained by spasms of masticatory muscles. It can occur as acute or recurrent dislocation (Rowe, 1970). A variety of therapeutic approaches designed to limit the forward excursion of the condylar head have been applied, such as intracapsular injection of sclerosing solutions, lateral pterygoidmyotomy, and scarification of the temporalis tendon (Norman, 1990 and Pertes, 1990). Creating a mechanical obstacle in the condylar path has also been achieved by positioning the disc anterior to the condyle, by down-fracturing of the zygomatic arch and fixation medial to the eminence, or by the insertion of implants into the eminence and bone

grafting augmentation or application of a well-designed alloplastic impediment with Vitallium mesh or titanium plates. Removal of the mechanical obstacles in the condylar path occurs, thereby permitting free movement of the condyle; such procedure is eminectomy, which has been used with satisfactory results and efficacy. However, improved interventions with simple procedures and predictable benefits are still expected by patients and stomatological clinicians. Hypertonic dextrose is the most commonly used prolotherapy solution, with favorable outcomes shown in multiple clinical trials. It is inexpensive, readily available, and reported to be safe. Proliferative injection therapy (prolotherapy), also known as ‘‘stimulation injection,’’ has been used to improve ligament, tendon, and joint healing for more than 60 years (Orhan, 2009). Prolotherapy, the rehabilitation of ligaments or tendons by induced proliferation of cells by using dextrose, is a noninvasive and effective method for the treatment of temporomandibular joint (TMJ) subluxation. We hereby present a case report of a patient who had presented with Chronic Recurrent TMJ subluxation and was treated with the Prolotherapy using 25% Dextrose solution.

MATERIALS AND METHODS

A 27year-old patient came to the maxillofacial outpatient department who complained that the he had Recurrent lock jaw since last three years on wide opening of his mouth. On examination, the patient had pain on his left side preauricular region with no clicking sound and unassisted mouth opening reduced to 3 cm. There was lower midline shift 3 mm towards left side while opening mouth. Lateral excursive & protrusive movements were limited. Clicking sounds and muscle tenderness in the region of masseter on left side were also present. On intraoral examination, no soft tissue deformity detected, no signs of attrition of teeth were seen, occlusion is angle’s class 1 on right side, there were 15 & 47 missing. The TMJ open & close view was done for the patient. The digital lateral double TMJ radiographs, open position, showed presence of left condyles anterior to the articular eminence in varying degrees. After evaluating the clinical and radiographic examination we have reached at the differential diagnosis of Tmj hypermobility, this could be either chronic recurrent Tmj dislocation or Tmj subluxation the another possibility is internal disc derangement for which MRI is needed as our patient is unable to afford the investigation, we have choosen prolotherapy for the treatment. The technique of prolotherapy is outlined as follows. The skin of the preauricular region was disinfected with iodine solution and cleansed with alcohol afterward. Because the TMJ disc usually displaces anteriorly, the main aim was to provide healing of detrided posterior disc attachment. Posterior joint space was located through palpating the lateral pole of the condyle as the patient opens and closes his/her mouth. The depression just anterior to the tragus was marked with a skin marker pen as the posterior disc attachment reference. The second reference point for injection was the superior joint space and the TMJ capsule. Lateral pterygoid muscle attachment was the third reference point to be injected owing to the laxity of this muscle. For the first injection into posterior disc attachment, the patients were asked to keep their mouths open to avoid moving the condyle back to the glenoid fossa and onto a needle. The target was the depressed area just anterior to the tragus of the ear. After pricking the marked skin using a 30-gauge needle, the needle was directed medially and anteriorly to avoid penetrating into the outer ear canal, then the medial wall of the glenoid fossa was encountered and 1 mL of PrT solution was injected here. After penetrating the skin.

Figure 1. Clinical picture of patient

Figure 2. A digital lateral double TMJ radiograph showing left condyle just anterior to the articular eminence in the open position

Figure 3. A digital orthopantamogram showing flattening of articular eminence anterior to left condyle.

On the second reference point, the needle was moved deep until the medial wall of the fossa was filled with superior joint space injection while the patients’ mouth was kept open and the 1-mL solution was injected. The final injection to the lateral pterygoid muscle attachment for strengthening the tendinous attachment to the disc was performed by asking patients to keep their mouths closed and pricking the marked skin at the depression just anterior to the condyle. The needle was directed medially and anteriorly, and after negative aspiration was achieved, injection of the 1 mL of solution was

performed. The PrT solution consisted of 1 mL of lignocaine hydrochloride and 1 mL of 25% dextrose. In the end, 1 mL of the solution was injected for each reference point. The aim of the local anesthesia was to provide postoperative comfort. The PrT procedure consisted of 2 sessions of injection of dextrose with a 2-week interval, and the patients were instructed to stop using anti-inflammatory drugs because of concerns that their anti-inflammatory action might interfere with the response to PrT. The patients were monitored for 1 hour for an allergic reaction and then were examined whether they have a post injection flare in pain level. The patients were also instructed to avoid forcing the TMJ while yawning, chewing, and speaking and have a soft diet for 2 weeks after each.

Figure 4. The reference line for locating the articular fossa & point below this line indicates the site for insertion of needle.

Injection Maximum mouth opening was measured before each session; also, TMJ pain on function, chewing function efficacy, and quality of life were measured using a visual analog scale (VAS) before each session. In addition, the frequency of locking episodes were assessed according to the number of locking episodes in a 4-week period between the dextrose injections. The patients were also examined on the account of presence of clicking sound before and after the surgery Pain evaluation was performed by asking the patients to assess their pain level as directly proportional on the VAS, beginning from 0 to 10. Chewing function efficacy was evaluated through marking the scale from 0 as no function to 10 as complete function. The patients were also asked to score their quality of life on a VAS, which was also done for chewing function efficacy. The measurements for all parameters that were performed previously were also done on the next PrT session.

RESULTS

1-mL solution of 10% dextrose was injected around the TMJ of the patient for 2 sessions. The patient had only mild pain after the injection and no other complaint.

Maximum Mouth Opening: Maximum mouth opening was measured as the gap between the upper right first central incisor and the lower right first central incisor and decreased throughout 4 weeks with a 2-week period, which may be attributed to strengthening the ligaments.

Frequency of Locking Episodes: All patients had a history of TMJ dislocation. The frequency of locking episodes significantly decreased after the first injection, patient had 4 luxations in a 2-week time after the first injection. These results indicated that the frequency of locking episodes decreased significantly.

Visual Analog Scale Scores for Quality of Life: According to the VAS scores for the quality of life, significant improvement from the preoperative values to the 2nd session was observed. The data obtained from the patients had shown a gradual increase between all sessions starting from the first session. Preoperative VAS score for quality of life was 3, whereas the end values rose up to 7.

Visual Analog Scale Scores for Pain on Function: Pain on function was common for all of the patients who have undergone PrT. Pain score levels were reduced significantly by the following injections of 25% dextrose solution. The mean (SD) pain score on the VAS scale for pain on function was 6 before the surgery, which decreased to 3 consistently from the first session to the end of the study.

Chewing Function Efficacy: Because of a luxation history and a weak lateral pterygoid muscle, the patient had a complaint of deficiency in their chewing function efficacy. Significant improvement in chewing function efficacy starting from the first injection was presented. Preoperative chewing function efficacy score was 5, whereas the end score after the 2nd session was 3.

Clicking Sound: Clicking sound was present in the patient at the beginning of the study. The sound was less after the first session. The patient had the less clicking sound with a decreased intensity at the end of the study.

DISCUSSION

Many different surgical and nonsurgical techniques have been used to treat patients with chronic recurrent temporomandibular joint (TMJ) hypermobility (Cascone, 2008; Norman, 1990 and Pertes, 1990). The nonsurgical techniques consist of injecting different substances into the TMJ area. Prolotherapy has been used in clinical practice for more than 100 years to treat various chronic conditions under different terms, such as sclerotherapy, proliferative injection therapy, proliferant injection, regenerative injection therapy, and growth factor stimulation injection therapy (Aaron Liddell, 2015 and Rowe, 1970). It is an injection therapy consisting of repeated injections of an irritant solution at or near the site of connective tissue dysfunction over the course of several months (Kenneth Dean Reeves, 2016). Prolotherapy is an inter-ligamentous injection to enhance proliferation and regeneration of the tendons, ligaments and joint healing with a medicament that stimulate proliferation of fibrous tissue to repair and stabilize the fibro-osseous junctions (Hakala, 2015). This injection technique was first introduced in 1937 by Louis Schultz as an effective treatment for painful subluxation of the TMJ (Emad, 2010 and Co¨mert Kilic, 2016). Prolotherapy has also been advocated for the treatment of osteoarthritis and laxity of other joints, lower back pain, and headaches.

In a prospective study, Refai et al assessed the efficacy of dextrose PrT for the treatment of TMJ hypermobility. They demonstrated that PrT with 10% dextrose seemed promising for the treatment of symptomatic TMJ hypermobility (Schultz, 1937 and Reeves, 2000). Hakala and Ledermann presented the

clinical survey of 30 patients treated with PrT and documented the effectiveness of TMJ PrT, even in cases refractive to conventional treatment with an intraoral arthrosis, physical therapy, home exercises, and dietary restrictions. The results of this study showed that PrT could be very effective, even in this group of patients. Also, they speculated that PrT would be even greater when used in milder cases of temporomandibular dysfunction[17]. In a retrospective observational study, Alderman et al used the technique of dextrose PrT on patients who presented with more than 5 years of unresolved TMJ pain and dysfunction. They demonstrated that PrT was a treatment that can be considered for people with unresolved TMJ pain and dysfunction. Dextrose, the most common proliferant used in PrT, was used for stimulating inflammation because of its safe nature in comparison with different proliferants such as phenol-glucose-glycerin (P2G) and sodium morrhuate. Refai et al used 2 mL of 10% dextrose and 1 mL of 2% mepivacaine for each TMJ in a previous study of dextrose PrT for TMJ hypermobility, which consisted of a study group and a control group. Hakala and Ledermann applied 12.5% dextrose solution, which consists of 0.75 mL of 50% dextrose and 0.75 mL bacteriostatic water, and 1.5 mL of 2% lidocaine was injected to each TMJ. According to Hakala and Ledermann, precise concentration of solution was not critical because of the strong hypertonic nature of the solution to allow attraction of fibroblasts and to begin the regeneration process (Yelland, 2004).

Different proliferant irritants have been suggested for prolotherapy of the hyper-mobile joint. Dextrose was selected as the proliferant in the present case report because it is the most common proliferant used for prolotherapy (Hackett, 1962 and Hagberg, 2004). Dextrose is readily available and inexpensive when compared with other proliferants, and it also has a good safety profile. Different concentrations of dextrose ranging from 10% to 50% have been used as the prolotherapy agent for TMJ hypermobility. Dextrose concentrations >10% have been shown to be effective. The Concentration of the dextrose solution injected was 25% in our case report, which was manifested as the amounts that are enough to create inflammatory stimulus to strengthen ligaments. Our PrT solution included only dextrose and lignocaine. Dextrose was used for strengthening ligaments and inducing an inflammation, whereas the local anesthetic was used for postoperative comfort. We did not use bacteriostatic water unlike Hakala and Ledermann's study, which claims that symptoms of TMJ disorder are related to bacterial activity in TMJ synovial fluid. Hakala and Ledermann evaluated pain on palpation, clicking sound, and the maximum mouth opening. Pain and clicking parameters decreased significantly, but the maximum mouth opening improved according to their study results. Refai et al compared the PrT technique with a control group to manage TMJ hypermobility, and the parameters measured were TMJ pain on palpation, frequency of locking episodes, maximum mouth opening, and clicking sound. According to their study, pain on palpation decreased in both PrT group and control group injected with a local anesthetic. Frequency of luxations and clicking sound exhibited no significant difference in both groups, whereas the maximum mouth opening decreased significantly in the PrT group. In this current case report, pain on function, clicking sound, maximum mouth opening, chewing function efficacy, quality of life, frequency of locking episodes were evaluated. The decrease in pain was similar with the results of both aforementioned TMJ PrT studies (Yelland, 2004). The significant decrease in clicking was also in accordance with Hakala and Ledermann's study. Likewise, in Refai et al's study, a significant decrease in frequency of luxations was also observed (Schultz, 1937 and Reeves, 2000). Despite the fact that it was not significant, a tendency to decrease was present in the maximum mouth opening in our case report in opposition to Hakala study in which the maximum mouth opening was shown to be increased significantly. The reference points for injection were also different in these 3 studies of PrT for TMJ. Whereas Hakala's reference points for injection were the posterior disc attachment, the anterior disc attachment, and the most tender point of the masseter muscle, Refai's reference points were the superior capsular attachment on the lateral wall of the glenoid fossa, the inferior capsular attachment on the condylar neck, and the superior joint space (Reeves, 2000). Our reference points for injection were the posterior disc attachment, the superior joint space, and the lateral pterygoid muscle attachment.

Conclusions

The results of this case report show that PrT can be used as an efficient, simple, and conservative method to treat TMJ Hypermobility.

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