

Long-term therapeutic effects of dextrose prolotherapy in patients with hypermobility of the temporomandibular joint: a single-arm study with 1-4 years' follow up

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Abstract

The aim was to analyse the short-term and long-term therapeutic efficacy of dextrose prolotherapy for dislocation or subluxation (hypermobility) of the temporomandibular joint (TMJ). Sixty-one patients with symptomatic hypermobility of the TMJ were included in this single-arm prospective study, in which they were each given four sessions of intra-articular and pericapsular injections six weeks apart. Each injection comprised 10% dextrose/mepivacaine solution 3 ml. Clinical outcomes including severity of pain on movement according to the numerical rating scale (NRS), maximal interincisal opening, clicking, and frequency of locking were measured before treatment (T1), during treatment (T2) (just before the third session of injections), at the short-term follow-up (T3) (three months after treatment), and at the long-term follow-up (T4) (1-4 years after treatment). Condylar translation and osseous changes of each joint were evaluated at T1 and T4 using tomography. There was significant reduction in all variables by T2 ($p < 0.001$, $p < 0.001$, $p = 0.006$, and $p < 0.001$). The pain scores ($p < 0.001$) and clicking ($p < 0.001$) had decreased significantly by T3. Linear tomograms of each joint at T1 and T4 showed no alteration in the morphology of the bony components of the joint, and at T4, tomographic open views of all joints showed condylar hypertranslation. Dextrose prolotherapy provided significant and sustained reduction of pain and recovery of constitutional symptoms associated with symptomatic hypermobility of the TMJ without changing either the position of the condyle or the morphology of the bony components of the joint.

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Keywords: dextrose prolotherapy; intra-articular injection; TMJ hypermobility; dislocation

Introduction

Hypermobility of the temporomandibular joint (TMJ) results from condylar dislocation in front of the eminence when the mouth is opened wide.¹ It is noted only when it is associated with symptoms (pain and sounds in the TMJ, otalgia, headache, and open lock) and interferes with smooth mandibular movements.^{2–6}

Symptomatic hypermobility of the TMJ has been managed in several ways based on intervening in one of three

pillars of joint stability: bony anatomy, associated musculature, or ligaments.⁷ These interventions include tightening of the capsule through capsular plication, capsulorrhaphy, reinforcement of the capsule with temporal fascia, injection of autologous blood, prolotherapy,^{1,5,8–10} creation of a mechanical obstacle to block excessive anterior excursion of the condyle by the insertion of bone graft or implants into the eminence,^{8,11} removal of the mechanical obstacles to allow free movement of the condyle through eminectomy, eminoplasty and menisectomy^{2,3,12} or creation of a

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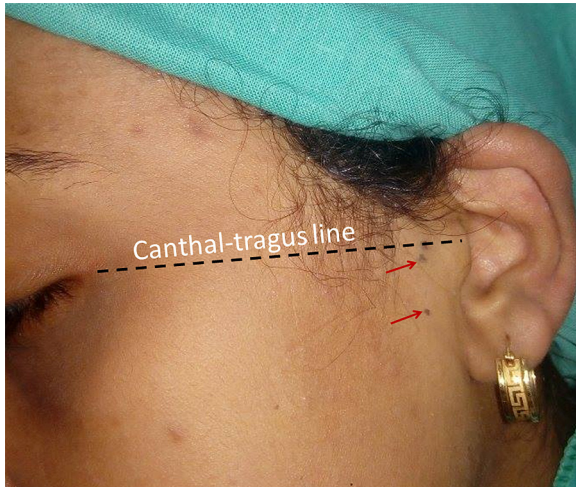


Fig. 1. Marking two points for the insertion of needles (arrows).

new muscular balance through scarification of the temporal tendon, myotomy of the lateral pterygoid muscle, and injection of botulinum toxin type A into the lateral pterygoid muscles.^{8,13–15}

During the past few years, dextrose prolotherapy has been used for the treatment of hypermobility of the TMJ with impressive outcomes. Prolotherapy, also called regenerative injection treatment, is an alternative treatment in which an irritant solution is injected into a joint space, weakened ligament, or tendon insertion, to relieve pain. Historically, this was called “sclerotherapy” because early solutions were thought to form scars. “Prolotherapy” is currently the most commonly-used term, which is short for proliferation therapy and is based on the presumed “proliferative” effects on chronically injured tissue.¹⁶ Some contemporary authors name it according to the solution injected.^{5,17} The common substance used is dextrose, but the choice of solution varies depending on the practitioner’s preference and may contain Sarapin[®], morruate sodium, zinc, or other natural ingredients, combined with a local anaesthetic.¹⁷ It may be given as a single injection or a series of injections.

The mechanism of prolotherapy is not clearly understood. However, it has been hypothesised that it works by causing temporary, low grade inflammation at the injection site, which activates fibroblasts in the area, and these in turn synthesise precursors to mature collagen and reinforce connective tissue. The inflammatory stimulus of prolotherapy raises the concentration of growth factors to resume or initiate a new sequence of connective tissue repair, which had prematurely aborted or never started.¹⁸

Hypertonic dextrose is the most common proliferant used in prolotherapy with concentrations ranging from 10% - 50%,^{4,5,19} and evaluation of it in cases of symptomatic hypermobility of the TMJ has shown impressive outcomes.^{4–6,19} Irrespective of the volume and concentration of the solution injected, the sites injected, and the number of sessions, the evidence from published studies has indicated that it

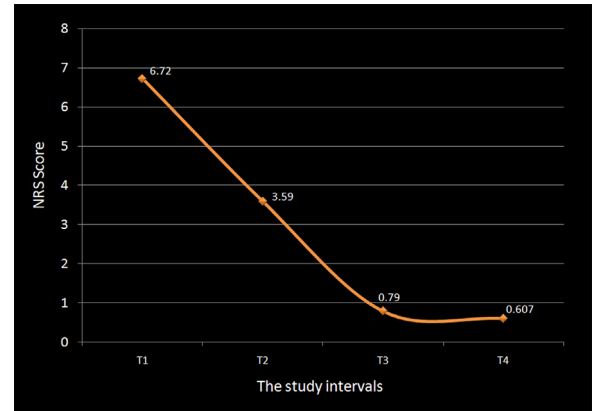


Fig. 2. Effect of time on pain scores.

significantly reduced pain in the TMJ and can be used as an efficient, simple, and conservative way to treat dislocation of the TMJ.^{5,6,19}

We know of four published studies about dextrose prolotherapy for the treatment of hypermobility of the TMJ,^{4–6,19} but these limited reports came to no conclusions about whether it reduced condylar translation and provided long-term resolution of symptomatic hypermobility of the TMJ. The purpose of the present study was to evaluate its clinical and radiographic outcomes in 61 patients with bilateral symptomatic hypermobility of the TMJ during a follow-up period of up to 4 years, with special attention paid to the pattern of improvement and the likelihood of recurrence.

Patients and methods

This single-arm prospective study was approved by the Research Ethics Committee at the Faculty of Oral and Dental Medicine, Cairo University, Cairo, Egypt. Inclusion criteria were: the clinical diagnosis of symptomatic hypermobility of the TMJ confirmed radiographically by tomography in the closed and maximal mouth opening positions; age ≥ 18 years; and willingness to receive relatively painful injections and to follow instructions. Patients were excluded if they had dystonia, drug induced hypermobility, had had a previous operation on the TMJ, or had any medical condition that could interfere with treatment. Sixty-one patients with bilateral symptomatic hypermobility of the TMJ were included and gave their signed, informed consent.

The diagnosis of hypermobility was based on history and on clinical recognition of excessive abnormal excursion of the condyle that slides over the articular eminence and briefly catches the eminence anteriorly, before it returns to the fossa by self reduction or with medical assistance. Radiographic evidence of the condyle sliding in front of the articular eminence in the open-mouth position confirmed the clinical diagnosis.

Each patient was given four sessions of intra-articular and pericapsular injections six weeks apart. Two injection

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