

Prolotherapy in the management of temporomandibular joint disorders

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ABSTRACT

Discomfort and dysfunction in the jaw joint and its surrounding tissues are hallmarks of a complex set of disorders known as temporomandibular disorders (TMD). A newer method for treating TMD is prolotherapy, which is a kind of regenerative injectable treatment. A proliferant fluid, often dextrose, is injected into the joint area to induce a localised inflammatory response. This reduces temporomandibular joint discomfort while also encouraging tissue healing. When alternative treatment options for temporomandibular disorders (TMDs) have failed, prolotherapy may be a lifesaver. The regenerative nature of prolotherapy aligns with the need for interventions that address the underlying causes of TMD, such as joint laxity and ligamentous instability. For a successful outcome of prolotherapy, there must be a proper selection of patients and identification of specific subtypes of TMD. This article provides an overview of the different temporomandibular disorders and the application of prolotherapy in these disorders, summarizes existing evidence and highlights the key findings.

Keywords

dextrose, proliferant solution, prolotherapy, temporomandibular disorders, temporomandibular joint pain

INTRODUCTION

The International Association for the Study of Pain (IASP) Task Force on Taxonomy defines pain as an unpleasant sensory and emotional experience that is either directly or indirectly linked to tissue damage, or explained in terms of such effects.^{1,2} The aetiology, pathophysiology, location, severity, and duration of pain are the main categories into which it may be categorised. The length of time a patient feels pain determines whether it is acute or chronic. In contrast to chronic pain, which lasts for more than three months, acute pain usually goes away within that time frame. In contrast to chronic pain, which lasts beyond the typical healing period and has no biological function, acute pain is temporary and goes away when tissues mend and restore themselves^{3,4}. The International Classification

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of Diseases, Eleventh Revision (ICD-11) distinguishes between six subtypes of chronic pain, with primary chronic pain being the first and secondary chronic pain being the others. Primary chronic pain is defined as long-lasting discomfort that causes substantial psychological suffering or impairment in daily functioning, to the point that the pain is considered an illness in and of itself. The second kind of pain is that which develops as a result of another medical condition; in other words, pain that is seen as a sign of an illness.^{5,6} According to Merskey, chronic pain is defined as ongoing discomfort that does not often respond to either targeted therapies or more conventional means of pain management, such as non-narcotic analgesics.⁷

Over the years, chronic pain management has been perceived by healthcare providers as time consuming, complicated and even at times ineffective.⁸ Medication is often overprescribed and useless tests are performed in an effort to determine the source of pain.⁹ As a result, there is an urgent need to develop effective treatments for chronic pain so that people may reclaim their functional capacity, enhance their mental health, and ultimately experience less pain.

Inflammation is the first step in wound healing; it is during this phase that granulocytes, monocytes, and macrophages go to the site of injury. The next step is the secretion of growth factors, which stimulate fibroblasts to produce a new collagen fibril matrix. Present anti-inflammatory medications alleviate swelling and pain, but they impede the body's natural healing process by reducing inflammation. In order to strengthen the joints, tendons, and ligaments, prolotherapy triggers an inflammatory response and enhances the body's inherent healing mechanisms by promoting the proliferation of fibroblasts.¹⁰

PROLOTHERAPY AND TEMPOROMANDIBULAR DISORDERS:

Muscle hyper- or parafunction, alterations in the joint's structure and function, or both may lead to temporomandibular joint diseases. Although 2% of people with TMJ-related jaw discomfort actually seek medical attention, the actual prevalence of this condition is 5%.^{11,12} There are two main categories for these conditions: articular and nonarticular. Myofascial dysfunction, muscular spasms, and myositis are all examples of muscle diseases that fall within the category of nonarticular disorders. Internal derangement

of the joints, arthropathies (both inflammatory and non-inflammatory), diseases of growth, and disorders of connective tissues etc. Problems with the temporomandibular joint (TMJ) or the muscles that chew food may cause face discomfort, limited or abnormal jaw mobility, and noises made by the TMJ when the jaw is moved or used.¹³ While the exact reason behind most cases of TMD is still a mystery (idiopathic), there are theories that point to occlusal disharmony as a possible association¹⁴. In 1950, a muscular dysfunction and intracapsular pathologies were categorized as the causes of this disorder.^{15,16,17,18} Prolotherapy is defined as the induction of cell proliferation, aims to rehabilitate structurally deficient elements like ligaments or tendons. The term "Proles" signifies growth, and prolotherapy injections stimulate the growth of new, healthy ligament and tendon tissues^{19,20}. The method encourages the body to mend the injured region by facilitating the body's own healing mechanisms; it is non-invasive, straightforward, and natural. For the purpose of stimulating the ligament to proliferate, dextrose is injected into it. A stronger ligament and less discomfort are the goals of these injections.

Particularly in stubborn situations where conservative treatment has been unsuccessful, it shows promise as a method for managing TMDs.²¹

TECHNIQUE

- The operation should be performed every 2, 4, or 6 weeks for a total of 12 weeks.
- To minimise the danger of syncope and maintain head stability, patients are placed in a supine or reclined posture. Turning the head away from the injection location is done.
- On freshly cleaned skin, anatomical markers are delineated before to injection. I recommend using a 3cc syringe that has a 30-gauge, 1-inch needle.
- The patient's front teeth are clamped down on a biting block or dental cotton rolls to get access to the superior joint area, which allows the mandibular condyle to slide down the glenoid slope. Proper articular injection technique requires careful patient posture, careful needle selection, and a methodical approach, all of which are emphasised in this protocol.
- After passing through the joint space between the tragus and the posterior condyle, the injection needle is guided higher and forward towards the

fossa apex, eventually touching the periosteum in the superior joint space.

- A little resistance should be felt when reaching the joint capsule. The needle is guided and gently retracted if there is too much resistance, such that it makes superficial but appropriate contact with the bone's periosteum.

PROLIFERANT SOLUTION

Osmotic agent, inflammatory mimetic, chemical irritant, and physical irritant are the four essential components of the proliferant solution used in prolotherapy.

The osmotic agent is a 12.5% solution of dextrose obtained by combining 50% dextrose with 1% preservative-free lidocaine and bacteriostatic water. One part bacteriostatic water to two parts 1% lidocaine is the ideal ratio, with one part 50% dextrose. One way dextrose works is by making the surrounding water very salty, which causes the cell walls of neighbouring cells to lyse and releases proteins and inflammatory byproducts. Fibrous healing and localised inflammation are both set off by this mechanism. The fact that maize is a source of dextrose means that people with maize allergies should exercise care.¹⁹

Hypertonic dextrose, specifically in concentrations of 10%, 12.5%, 16.5%, 20%, and 25%, is a common injectant in prolotherapy. These injections are often mixed with local anesthetics in varying ratios of 1:1, 1:2, 1:3, 1:4, or 2:5.²² As dextrose is a safe component of blood chemistry, it is considered an ideal proliferant. Sodium morrhuate (5%) is considered as an alternative if the dextrose solution proves to be ineffective. Sodium morrhuate includes benzyl alcohol and cod liver oil salts.²³ A alternative formulation that is diluted with local anaesthetics before injection is the dextrose/phenol/glycerin (DPG) solution, which consists of 25% dextrose, 25% glycerin, and 2.5% phenol.

In prolotherapy, phenol and pumice flour operate as chemical and physical irritants, drawing in macrophages and granulocytes via cell wall damage/alteration or foreign body response.

ALTERNATIVE TECHNIQUE

- Injecting a 1cc solution posterior to the partly translated condyle is the standard procedure for TMD cases with stretched posterior discal ligaments, anterior/anteromedial disc displacement, and disc displacement.

- To prevent puncturing the ear, the needle is angled upwards and downwards, perpendicular to the plane of the tympanic bone.
- When the incisal biting stop is removed, 1 cc of solution is injected anterior to the palpated condyle, directed inferiorly to the glenoid eminence and zygomatic arch, and then anteromedially along the articular slope contour if the anterior discal ligaments and superior lateral pterygoids are implicated.
- It is standard practice to inject the stylomandibular ligament with the needle point against the periosteum rather than beneath it when treating injuries to this ligament.²⁴

After needle withdrawal, the injection site is checked for bleeding. If there is minimal bleeding, it is typically halted with direct pressure. The procedure is repeated on the affected opposite side if necessary.

ADVERSE EFFECTS

- Because the condyle and mandible are distracted when fluid is injected into the articular area during prolotherapy, a posterior open bite might be briefly caused.
- The patient runs the danger of inadvertently biting their tongue or buccal mucosa in that particular area due to the local anaesthetic effect.²⁵
- Prolotherapy has the potential to induce a short-lived numbness, which may sometimes spread to the eye and lead to ptosis.²⁶
- Bleeding episodes with external bleeding and bruising on the face may occur.²⁷
- In some cases, anxious patients may experience syncope, which can be minimized by placing them in a supine position.

CONTRAINDICATIONS

Conditions contraindicating prolotherapy include allergies to its components, active infections, healing disorders, excessive bleeding conditions like hemophilia, malignant conditions, and the presence of parafunctional habits such as bruxism, which should be addressed before considering prolotherapy.

CONCLUSION

In conclusion, prolotherapy stands as a promising and minimally invasive therapeutic approach for



various musculoskeletal conditions, including Temporomandibular Disorders (TMD). By harnessing the regenerative potential of hypertonic dextrose and other proliferative agents, prolotherapy aims to stimulate tissue repair, strengthen ligaments, and alleviate pain. While existing literature shows encouraging results, further well-designed clinical trials and research are essential to establish its long-term efficacy, safety

profile, and optimal protocols. Prolotherapy's potential to address the root causes of chronic pain, coupled with its relatively low risk and minimal invasiveness, positions it as a valuable option in the evolving landscape of pain management. Continued exploration and refinement of this technique hold promise for improving the quality of life for individuals grappling with challenging musculoskeletal conditions.

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