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CASE STUDY: THE EFFECT OF DEXTROSE PROLOTHERAPY FOR JOINT HYPER-MOBILITY SYNDROME

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ABSTRACT

Introduction: Joint hypermobility syndrome (JHS) is a hereditary connective tissue disorder, characterised by musculoskeletal pain and an excessive range of motion in joints1. JHS include symptoms such as arthralgia, proprioception difficulties, fatigue, soft tissue injury and joint instability. It has been reported that symptomatic joint hypermobility affects around 5% of women and 0.6% of men4. The prevalence of JHS amongst those attending rheumatology and physiotherapy clinics has been estimated to be between 30% and 60% and is higher in non-Caucasian populations. Prevalence of generalised joint hypermobility among college-aged students ranges from 12.5% to 26%23-24. Our case report is about 20 years old male patient came with chief complain of recurrent sterno-clavicular joint dislocation, bilateral shoulder and knee pain with instability6. **Aim of the study:** To evaluate the effect of dextrose prolotherapy with 5% concentration in the management of Joint hypermobility syndrome. **Materials & Methods:** Under strict asepsis using ultrasound guidance Prolotherapy with 25% dextrose (3ml), 2% lignocaine (3 ml) mixed with sterile water (4ml) with a total volume of 20ml were given into the bilateral shoulder joints intra-articular (posterior approach), bilateral sterno-clavicular ligaments, left intra-articular knee joint along with quadriceps & patello-femoral tendon, lateral and medial collateral ligaments, bilateral trapezius muscles for trigger point injection under ultrasound guidance. After the procedure patient was monitored for vitals. Prolotherapy session was done 3 times with 3 weeks gap between each session. **Result:** Patient reported 90% improvement in pain with NRS score of 2 after the third session of prolotherapy. Followed by increased in joints stability correlated with improvement in quality of life. **Conclusion:** Proliferant injections under image guidance may be a viable treatment option in patients with joint hyper-mobility syndrome who had failure of conservative treatment to control their symptoms.

KEYWORDS : prolotherapy, joint hypermobility syndrome, luxation, ligament, ultrasound

BACKGROUND

Joint hypermobility refers to increased active or passive movement of a joint beyond its normal range. Joint hypermobility syndrome (JHS) is a hereditary connective tissue disorder, characterised by musculoskeletal pain and an excessive range of motion in joints[1]. Collagen is the protein, supporting connective tissues (skin, ligaments, tendons, internal organ walls, cartilage, blood vessels) and defects in its synthesis may result in muscle weakness leading joint hypermobility, pain, luxations[7]. As there are no laboratory tests to indicate JHS[2], it is usually subjectively assessed using the Brighton diagnostic criteria[3], which include the Beighton score for joint hypermobility.

Beighton Score:

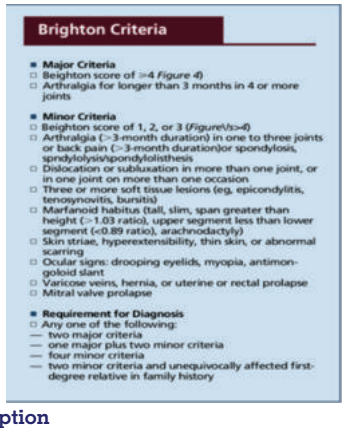
S.No.	Characteristic	Maximum Score
1	Passive dorsiflexion of each little finger beyond 90°	02 (01 for each side)
2	Passive apposition of each thumb to the flexor aspect of the forearm.	02 (01 for each side)
3	Hyperextension of each elbow beyond 10°	02 (01 for each side)
4	Hyperextension of each knee beyond 10°	02 (01 for each side)
5	Forward flexion of the trunk, with knees straight, so that the palms of the hands rested easily on the floor.	01

[Table/Fig-1]: Beighton's scale for assessment of joint hypermobility

Source:
Pragati Kaurani et al., Ehlers Danlos Syndrome – A Case Report

Brighton Diagnostic Criteria[32]:

Prolotherapy means rehabilitation of an incompetent structure such as a ligament or tendon by induction of cellular proliferation. Prolo comes from the word proliferate. Prolotherapy injections stimulate growth of new, normal ligament and tendon tissues by stimulation of low grade inflammation[14]. Monocytes, granulocytes, macrophages migrate to injured tissue by prolotherapy with activation of fibroblasts to produce matrix and new collagen fibrils. The temporary cellular stress causes release of cytokines and increased growth factors activity. Unlike repair after injury, disruption of the architecture of the tissue does not occur from injury and new cells and matrix are deposited in an organised fashion, with maturation of new tissue for 6-8 weeks[15]. Different concentration of dextrose solution have been used as a therapeutic injecting material. Prolotherapy has been used successfully to treat many painful joints in the body[16].



Case Description

A 20 year old male patient a student by occupation came to our outpatient department with chief complaints of multiple joints instability and bilateral shoulder pain since 2 years. Pain was insidious in onset, non-radiating, moderate pain and not associating with tingling or numbness, headache, tinnitus,

dizziness. No skin lesion, palpitation or ocular symptoms. Pain aggravates while playing sports, decreased at rest. His Numerical Rating Scale (NRS) was 7 and Verbal Rating Scale (VRS) was moderate. There was no significant family history of joint hyper-mobility or a significant medical history in the past. No significant history suggestive of an autoimmune phenomenon. Patient had taken a course of NSAIDs along with muscle relaxants and strengthening exercises but there was no improvement in his pain and laxity.

On clinical examination, he was moderately built and nourished, height 185 cm, weight 60 kg (BMI 17.5). Skin and hair were normal. There was no ectopia lentis, normal systemic examination. Skin, spine curvature, contour of the muscles and gait appears to be normal.
On Palpation, patient had trigger points onto the bilateral upper trapezius muscles, bilateral anterior capsular shoulder tenderness with subjective feeling of shoulder and sterno-clavicular joints instability with elevation above 90 degree also when lifting heavy weights. Also, subjective feeling of bilateral knee instability (left>right) with no significant genu recurvatum. No local rise in temperature, no sensory and motor deficits, all reflexes were intact.

On following the Brighton criteria, he had arthralgia >3months in 4 joints (Major criteria), Subluxation in 4 joints (minor criteria), arthralgia > 3 months duration in more than 4 joints (minor criteria), skin hyper-extensibility. Therefore, patient fulfilled the required diagnosis criteria for Joint Hyper-mobility syndrome. Hence, we decided to proceed with Prolotherapy.

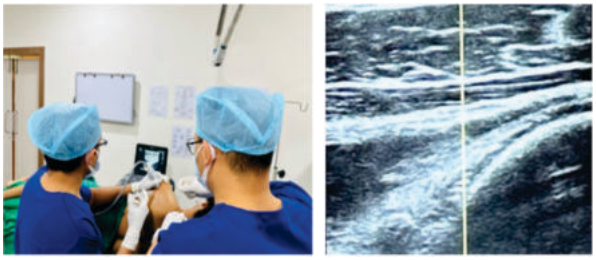


Fig: USG guided shoulder prolotherapy

After taking written informed consent, patient was shifted to procedure room, painted and draped. Under strict asepsis using ultrasound guidance Prolotherapy with 25% dextrose (3ml), 2% lignocaine (3ml) mixed with sterile water (4ml) with a total volume of 20 ml was given under ultrasound guidance into the bilateral shoulder joints capsule (posterior approach), bilateral sterno-clavicular ligaments, left intra-articular knee joint along with quadriceps & patello-femoral tendon, lateral and medial collateral ligaments, bilateral trapezius muscles for trigger point injection. After the procedure patient was monitored for vitals. Prolotherapy session was done 3 times with 3 weeks gap between each session. Before the treatment, patient had a chronic cycle of joint instability but after the last treatment patient had less apprehension about instability and pain reduction with NRS from 7 to 2.

DISCUSSION

Most treatments provided are palliative that revolve around the ramifications and complications of the condition. Joint hypermobility poses a huge problem for patients as it leads to frequent dislocations of various joints. A major consideration in the management would be to decrease the episodes of dislocations or instability and pain[31].

Ligaments play an important role in the function of synovial joints. Ligaments are specialised dense bands of tough, fibrous collagenous connective tissue bundles that attach one bone to another. Ligaments function to hold bones in approximation, assist joint proprioception and provide mechanical support and stability. Ligaments enable smooth joint motion under normal, physiologic circumstances and prevent excessive joint displacement under high loads[29]. Ligaments vary in size, shape, orientation and location[30]

There is no cure yet for the underlying collagen defect that leads to joint instability, joint dislocations, subluxations, progressive joint degeneration and disabling pain but it can be successfully treated with Prolotherapy. Prolotherapy injections to the areas where the ligaments attach to the bone (fibro-osseous junction) accomplished joint stability and decreased pain[25-28]. Prolotherapy initiates the normal wound healing cascade to start the ligament and joint repair process.

A study done by Majumdar et.al on "Single Injection Technique Prolotherapy for Hypermobility Disorders of TMJ Using 25 % Dextrose" shows 91.3% improvement in symptoms. Successful treatment outcome was defined as absence of any episodes of dislocation or subluxation for a minimum of 6 months after last injection[22]. In our case also, by using 25% dextrose patient reported 90% improvement in pain with absent of an episodes of dislocation within 6 months follow-up after his last injection.

Double blinded study on animal showed increased in ligament mass by 44%, ligament thickness by 27%, and ligament bone junction structure by 28% with 15% dextrose injection. Morphometric analysis of electron micrographs showed a highly significant corresponding increase of the collagen fibril diameters in the experimental ligament compared against the control MCL[19].

A double blinded study done by Centeno et.al on cervical prolotherapy for instability showed that there is joints stabilisation that correlated with improvement in patients outcome[18]. Where, the mean post-test VAS score (M= 3.83, SD=2.3, t=2.889) was significantly less (p=0.04) than the mean pre-test VAS score (M=5.75, SD=1.94).

Prospective study done by Shehata E on 33 patient with Temporo-mandibular joint dysfunction shows that prolotherapy with 12.5% dextrose gives pain reduction with improved in quality of life. Success was defined as absence or reduction of pain (at least 75% on visual analogue score) or absence of the need to take analgesics, improvement of maximum incisal distances and the absence or reduction of clicking[17]. Also in our case, patient had increased in joint stability leading to improvement in his quality of life.

A double-blind placebo-controlled study done by Reeves KD et.al. on dextrose prolotherapy for knee osteoarthritis with or without ACL laxity concluded that prolotherapy injection with 10% dextrose resulted in clinically and statistically significant improvements in ACL laxity. Individual paired t tests indicated that blinded measurement of goniometric knee flexion range improved by 12.8 degrees (P = .005), and Anterior displacement difference improved by 57% (P = .025).[31]

In our case also patient reported 90% improvement in pain with NRS score of 2 after the third session of prolotherapy. Followed by increased in joints stability correlated with improvement in quality of life.

CONCLUSIONS

This case report described the management of Joint Hypermobility Syndrome with prolotherapy to bilateral sterno-clavicular ligaments, bilateral shoulder articular capsules, left knee quadriceps tendon, patelo-femoral ligament, medial and lateral collateral ligaments. Therefore, proliferant injections under image guidance may be a viable treatment option in patients with joint hyper-mobility

syndrome who had failure of conservative treatment to control their symptoms. It is apparently an efficient and safe technique. The technique gives promising results regarding improvement of pain, joint stability and hence the quality of life.

More number of patients and more solid studies as prospective randomised controlled design will be eventually needed to evaluate the true efficacy of this technique in treating patients with joint hyper-mobility syndrome.

REFERENCES:

1) Jordan K, Clarke AM, Symmons DP, Fleming D, Porcheret M, Kadam UT, Croft P.(2007),"Measuring disease prevalence: a comparison of musculoskeletal disease using four general practice consultation databases". Br J Gen Pract. 57(534):7-14. PMID: 17244418; PMCID: PMC2032694.
2) Mayer, K., Kennerknecht, I. & Steinmann, B.(2013), "Clinical utility gene card for: Ehlers–Danlos syndrome types I–VII and variants - update 2012". *Eur J Hum Genet* **21**, 118.
3) Grahame R, Bird HA, Child A. (2000), "The revised (Brighton 1998) criteria for the diagnosis of benign joint hypermobility syndrome (BJHS)". J Rheumatol.;27(7):1777-9. PMID: 10914867.
4) Beighton P, Solomon L, Soskolne CL (1973). "Articular mobility in an African population". Ann Rheum Dis. 1973 Sep;32(5):413-8. doi: 10.1136/ard.32.5.413. PMID: 4751776; PMCID: PMC1006136.
5) Giunta C, Nuytinck L, Raghunath M, Hausser I, De Paepe A, Steinmann B (2002). "Ho- mozygous Gly530Ser substitution in COL5A1 causes mild classical Ehlers-Danlos syndrome". Am J Med Genet;109(4):284-90.
6) Malfait F, Coucke P, Symoens S, Loeys B, Nuytinck L, De Paepe A. (2005), "The molecular basis of classic Ehlers-Danlos syndrome: a comprehensive study of biochemical and molecular findings in 48 unrelated patient". Hum Mutat;25(1):28-37.
7) Malfait F, Wenstrup RJ, De Paepe A (2010), "Clinical and genetic aspects of Ehlers-Danlos syndrome, classic type". Genet Med;12(10):597-605.
8) Mao JR, Bristow J. (2001), "The Ehlers-Danlos syndrome: on beyond collagens. J Clin Invest;107(9):1063-9.
9) Yeowell, H.N.; Pinnell, S.R.(1993), "The Ehlers-Danlos syndromes". Semin. Dermatol. 12, 229–240
10) Steinmann B, Royce PM, Superti-Furga A(2003), "The Ehlers-Danlos Syndrome. In: Steinmann PMRaB, editor. Connective Tissue and Its Heritable Disorders: Molecular, Genetic, and Medical Aspects. 2nd ed." Hoboken, NJ, USA: John Wiley & Sons Inc.
11) Castori M.(2012)," Ehlers-danlos syndrome, hypermobility type: an underdiagnosed hereditary connective tissue disorder with mucocutaneous, articular, and systemic manifestations". ISRN Dermatol;2012:751768.
12) Byers P. (2001), "Disorders of collagen biosynthesis and structure. In: Scriver CR, Beaudet AR, Sly WS, Valle D, editors. The metabolic and molecular bases of inherited disease. 2nd ed. Edinburgh: Churchill Livingstone;.1065-81p.
13) Fleck MP, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, et. al.(2000),"[Aplication of the Portuguese version of the abbreviated instrument of quality life WHOQOL=bref]". Rev Saude Publica;34(2):178-83. Portuguese.
14) Hackett G, Henderson D (1955),"Joint stabilization: an experimental histologic study with comments on the clinical application in ligament proliferation". Am J Surg 89: 968-973.
15) Hackett G, Hemwall G, Montegomery G (1993) ,"Ligament and tendon relaxation treated by prolotherapy". Oak Park IL; Gustav A Hemwall MD. 51-78.
16) Hakala R, Ledermann K (2010), "The use of prolotherapy for tempromandibular joint dysfunction". J Prloloth 3: 441-447
17) Shehata E (2019) ,"Prolotherapy with 12.5% dextrose to treat temporomandibular joint dysfunction (TMD)". Int J Oral Craniofac Sci 5(1): 015-019. DOI: http://doi.org/10.17352/2455-4634.000039
18) Centeno CJ, et al. (2005) "Fluoroscopically guided cervical Prolotherapy for instability with blinded pre and post radiographic reading". *Pain Physician*;8:67-72.
19) Liu Y (1983). "An in situ study of the influence of a sclerosing solution in rabbit medial collateral ligaments and its junction strength. *Connective Tissue Research*".2:94-102.
20) Rabago D, et al.(2010) "Prolotherapy in primary care practice. *Primary Care*".;37:65-80.
21) Hauser RA, et al. (2009), "A retrospective study on dextrose Prolotherapy for unresolved knee pain at an outpatient charity clinic in rural Illinois. *Journal of Prolotherapy*".2:76-88.
22) Majumdar SK, Krishna S, Chatterjee A, Chakraborty R, Ansari N. (2016),"Single Injection Technique Prolotherapy for Hypermobility Disorders of TMJ Using 25 % Dextrose: A Clinical Study". J Maxillofac Oral Surg. 2017 Jun;16(2):226-230. doi: 10.1007/s12663-016-0944-0. PMID: 28439165; PMCID: PMC5385684.
23) Russek LN, Errico DM.(2006), "Prevalence, injury rate and symptom frequency in generalized joint laxity and joint hypermobility syndrome in a "healthy" college population". Clin Rheumatol;35:1029–39.
24) Reuter PR, Fichthorn KR.(2019),"Prevalence of generalized joint hypermobility, musculoskeletal injuries, and chronic musculoskeletal pain among American university students". Peer J;7:e7625
25) Hackett G. (1955),"Joint stabilization: an experimental, histologic study with comments on the clinical application in ligament proliferation". *American Journal of Surgery*;89:968-973.
26) Hauser RA, Hauser MA. (2017), *"Prolo Your Pain Away! Curing Chronic Pain with Prolotherapy"*.4th ed. Caring Medical Regenerative Medicine Clinics, Oak Park.
27) Steilen D, Hauser RWoldin B, Sawyer S.(2014), "Chronic neck pain: making the connection between capsular ligament laxity and cervical instability". *Open Orthopedic Journal*; 1:326-45.
28) Saladin KS. (2011), "Joints in Human Anatomy", 3rd ed., McGraw-Hill Higher Education.
29) Frank CB.(2004)"Ligament structure, physiology and function". JMusculoskel Neuron Interact 2004; 4(2): 199-201.
30) Anjali et.al. (2007) "Ehlers Danlos Syndrome: A Case Report", The AAO Journal/27.
31) Reeves KD, Hassanein K.(2000),"Randomized prospective double-blind placebo-controlled study of dextrose prolotherapy for knee osteoarthritis with or without ACL laxity". Altern Ther Health Med;6(2):68-74, 77-80. PMID: 10710805.
32) Simpson, Maj Michael R. (2006)"Benign Joint Hypermobility Syndrome: Evaluation, Diagnosis, and Management." *Journal of Osteopathic Medicine* *Journal of Osteopathic Medicine* 106: 531 - 536.