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Role of undenatured collagen type ii in management of osteoarthritis: A hospital based study

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Abstract

Osteoarthritis knee is a degenerative disease, predominantly seen in the elderly population, which caused by the destruction of the articular cartilage. The extra cellular matrix of the articular cartilage is predominantly made up of water, collagen, proteoglycans and other proteins. Altogether, these components help in maintaining its unique mechanical properties, among all the components, collagen alone makes up about 60% in extra cellular matrix, of which type II collagen alone makes up about 90% to 95%. Collagen derivatives have shown effective restriction in disease progression. This study analyses the efficacy of undenatured type II collagen in the treatment of osteoarthritis of knee. A total of 50 patient who fulfilled the inclusion and exclusion criteria, were randomly sampled in 2 groups, group A patients were treated with undenatured collagen type II and group B patients were treated with glucosamine chondroitin for 3 months. Functional outcome was measured using WOMAC score. In the initial follow up days there was minimal difference in the results between the groups. But later on, follow-up in 60 and 90 days shows significant reduction in WOMAC SCORE and VAS Score with UDC II group. Group A (UDC II) showed significant reduction in WOMAC score and effective improvement in quality of life in patients with mild to moderate osteoarthritis.

Keywords: Efficacy, osteoarthritis, undenatured collagen type II, glucosamine chondroitin, WOMAC SCORE, VAS SCORE

Introduction

Osteoarthritis is defined as “disorder involving movable joints characterized by cell stress and extracellular matrix degradation initiated by micro- and macro- injury that activates maladaptive repair responses including pro-inflammatory pathways of innate immunity. The disease manifests first as a molecular derangement (abnormal joint tissue metabolism) followed by anatomic, and/or physiologic derangements (characterized by cartilage degradation, bone remodeling, osteophyte formation, joint inflammation and loss of normal joint function (that can culminate in illness). Age is the most common risk factor for OA, other risk factors are post traumatic, repetitive joint movement, obesity and gender. OA is one of the major causes for pain and reduced ROM in Orthopaedics. Pain is due to hyaline cartilage lacking nociceptors, but neighboring structures do possess them. Due to the mechanical irritation by loose flaps from synovial and capsular inflammation, and from subchondral bone sclerosis where the pain is carried by periarticular free nerve endings. Reduced ROM is due to loss of joint incongruity, muscle spasm and contracture, this leads to muscle stiffness.

Pathophysiology: Weight bearing is the major function of articular cartilage. In OA, the articular cartilage can no longer act as a shock absorber because of disruption in the extra cellular matrix.

Treatment of OA: At early stage, pain management and early rehabilitation is mandatory, NSAIDS are generally used for pain management. Trial of undenatured type II collagen and chondroitin in animal tissues has shown improvement at early arthritis.

Chondroitin: It is a nutritional supplement made up of chondroitin sulphate. It is primarily a protein seen in extra cellular matrix.

It acts by inhibiting the degradation of cartilage and restores the normal cartilage structures. With the help of glucosamine, a Sulphur containing amino acid, it helps in structural rebuilding of cartilage molecules.

Undenatured type ii collagen: It is a collagen derivative, cultivated from chicken cartilage. Many studies in animals and human trials have suggested that UDC II is effective and safe in treating osteoarthritis. It acts by interacting with GALT (gut associated lymphoid tissue) in duodenum and this stimulates the antigens and decreases the systemic T cell action in the cartilage, thereby it suppresses the inflammatory response and cartilage damage.

The objective of the present study was to establish superiority in treating the primary or early arthritis using WOMAC and VAS SCORE.

Materials and methods

This study was carried out in Department of Orthopaedics, Chettinad Hospital and Research Centre, Kelambakkam, Chennai. During the period of 12 months from October 2019 to October 2020. A sample size of 50 patients with osteoarthritis fulfilling the inclusion criteria (25 in each group) who was managed with UDC II and glucosamine chondroitin for 90 days and evaluated with The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (Figure 2) and Visual Analog Scale (VAS SCORE) (Figure 1) at regular intervals.

Inclusion criteria

1. Patient with degenerative osteoarthritis.
2. Both sexes with 30 to 60 years of age.
3. Unilateral or bilateral osteoarthritis for more than 3 months.
4. Mild to Moderate OA as indicated by lequesne functional

- index with score ranging from 1 to 7 (Table 1).
5. Availability for duration of study period – 90 days.
6. VAS score with knee ROM between 40-70mm after 10 days of withdrawal of analgesic drugs.

Exclusion criteria

1. History of diabetes.
2. Recent injury to the area affected by Osteoarthritis.
3. Severe OA as indicated by lequesne function index score of 8 or more.
4. Hypersensitivity to NSAIDS.
5. H/O intra-articular steroid injection in last 1 year.

Table 1: Lequesne functional index

Index Score	Handicap
0	None
1 – 4	Mild
5 – 7	Moderate
8 – 10	Severe
11 – 13	Very Severe
>=14	Extremely Severe

Results

Patient of both groups were followed up at 30, 60, and 90 days and the functional results were compared using WOMAC scoring system and VAS score. WOMAC score and VAS Score from each treatment group were compared to baseline value at 30, 60 and 90 days. Group of patients who was managed with UDC II showed a significant reduction in WOMAC score and reduction in Visual Analog Scale compared to patients managed with glucosamine chondroitin (Figure 3a & b). Patients managed with UDC II showed a significant pain relief and early appreciable enhancement in daily activity compared to patients treated with glucosamine chondroitin.

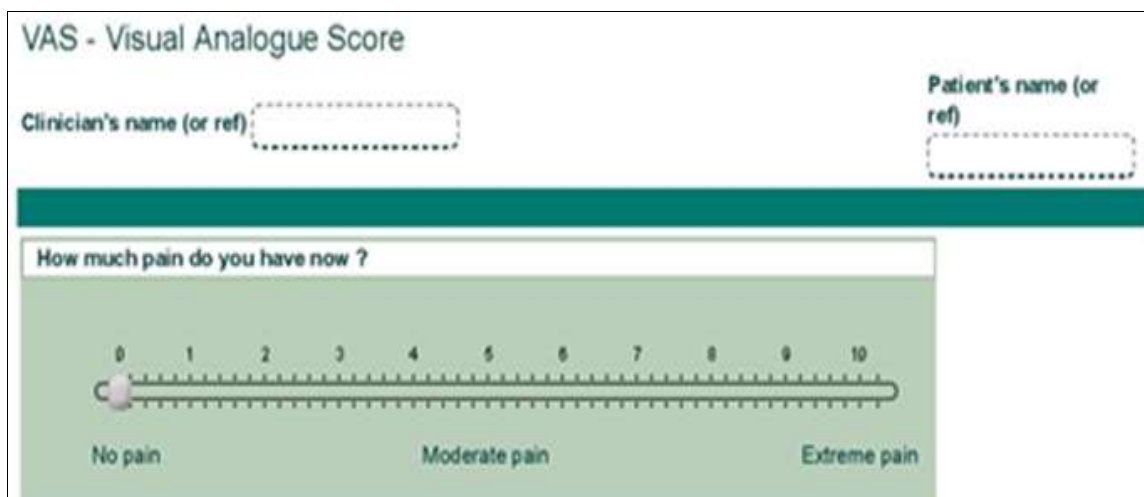


Fig 1: Visual Analog Scale

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)

Name _____ Date of Birth _____ Today's Date _____

Height _____ ft. _____ in. Weight _____ lbs.

Instructions: Please rate the activities in each category according to the following scale of difficulty:
 0 = None, 1 = Slight, 2 = Moderate, 3 = Very, 4 = Extremely Circle one number for each activity

Pain	1. Walking	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	2. Stair Climbing	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	3. Nocturnal	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	4. Rest	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	5. Weight bearing	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Stiffness	1. Morning stiffness	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	2. Stiffness occurring later in the day	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Physical Function	1. Descending stairs	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	2. Ascending stairs	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	3. Rising from sitting	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	4. Standing	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	5. Bending to floor	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	6. Walking on flat surface	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	7. Getting in / out of car	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	8. Going shopping	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	9. Putting on socks	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	10. Lying in bed	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	11. Taking off socks	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	12. Rising from bed	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	13. Getting in/out of bath	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	14. Sitting	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	15. Getting on/off toilet	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	16. Heavy domestic duties	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	17. Light domestic duties	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Total Score: _____ / 96 = _____ %

Comments / Interpretation (to be completed by therapist only):

Fig 2: Womac scoring system

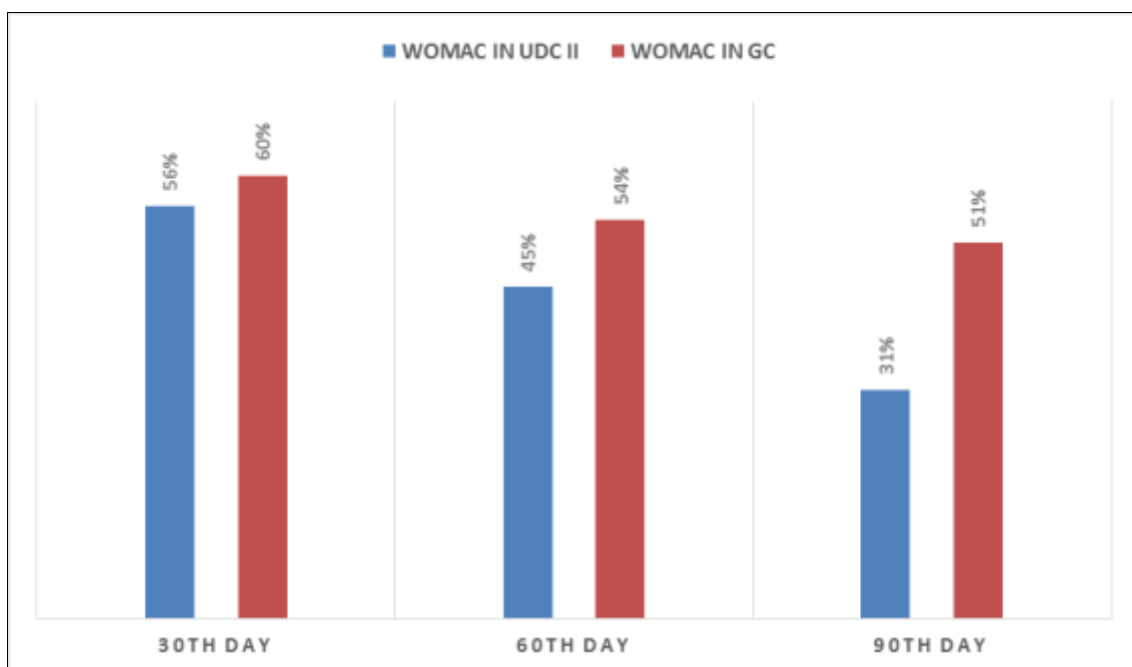


Fig 3(a): Comparison of WOMAC score in UDC ii and GC

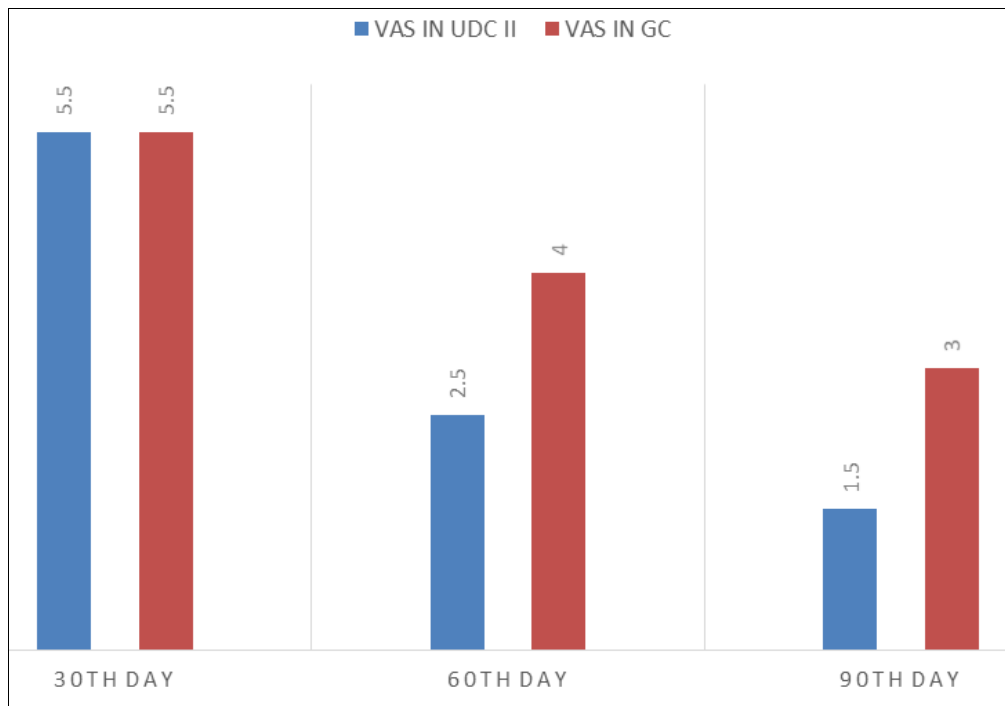


Fig 3(b): Comparison of vas score between UDC II and GC

Discussion

Osteoarthritis has been a most common Orthopaedic problem and it has a significant effect in the impairment of quality and daily activity of life. Though, there are many treatment protocols to relieve pain, stiffness and to maintain or improve functional status, there is no curative therapy currently established and available. In this study, efficacy of UDC II in compared with glucosamine chondroitin in the management of mild and moderate osteoarthritis. This study indicates both treatments reduced WOMAC score, measuring the parameters – physical function, stiffness and pain. In the initial follow up days there was minimal difference in the results between the groups. But later on, follow-up in 60 and 90 days shows significant reduction in WOMAC SCORE with UDC II group. The average mean VAS score was reduced to 1.5 compared to that of base line with UDC II. It was brought to a conclusion with the results, that UDC II has significant pain reduction and much more effective improvement in functional ability compared to that of Glucosamine chondroitin.

Conclusion

Osteoarthritis is the most common and significant medical concern mainly affecting middle age and elderly population. The main aim of the treatment in our Indian population is to reduce the arthritic pain and restore daily lifestyle. Although, several modalities have been in practice for the treatment of osteoarthritis, the easy availability and efficacy of UDC II has made it a significant potential alternative for the management of osteoarthritis. Based on the available evidence, it is clear that UDC II reduces joint discomfort effectively in mild to moderate osteoarthritis and improves overall quality of life of patients with osteoarthritis.

References

- Hochberg MC, Altman RD, April KT, Benkhalti M, Guyatt G, McGowan J *et al.* American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. *Arthritis Care Res (Hoboken)* 2012;64(4):465-74. doi: 10.1002/acr.21596.
- Crowley DC, Lau FC, Sharma P, Evans M, Guthrie N, Bagchi M *et al.* Safety and efficacy of undenatured type II collagen in the treatment of osteoarthritis of the knee: a clinical trial. *Int. J Med Sci* 2009;6(6):312-21. doi: 10.7150/ijms.6.312.
- Lotz M, Martel-Pelletier J, Christiansen C, Brandi ML, Bruyere O, Chapurlat R *et al.* Value of biomarkers in osteoarthritis: current status and perspectives. *Ann Rheum Dis* 2013;72(11):1756-63. doi: 10.1136/annrheumdis-2013-203726.
- Di Cesare ML, Micheli L, Zanardelli M, Ghelardini C. Low dose native type II collagen prevents pain in a rat osteoarthritis model. *BMC Musculoskelet Disord* 2013;14:228. doi: 10.1186/1471-2474-14-228.
- Towheed TE, Maxwell L, Anastassiades TP, Shea B, Houpt J, Robinson V *et al.* Glucosamine therapy for treating osteoarthritis. *Cochrane Database Syst Rev* 2005;2:CD002946.
- Lawrence RC, Felson DT, Helmick CG, Arnold LM, Choi H, Deyo RA *et al.* Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. *Arthritis Rheum* 2008;58(1):26-35. doi: 10.1002/art.23176.
- Bagchi D, Misner B, Bagchi M, Kothari SC, Downs BW, Fafard RD *et al.* Effects of orally administered undenatured type II collagen against arthritic inflammatory diseases: a mechanistic exploration. *Int. J Clin Pharmacol Res.* 2002;22(3-4):101-10.
- Nagler-Anderson C, Bober LA, Robinson ME, Siskind GW, Thorbecke GJ. Suppression of type II collagen-induced arthritis by intragastric administration of soluble type II collagen. *Proc Natl Acad Sci U S A* 1986;83(19):7443-6. doi: 10.1073/pnas.83.19.7443,
- McAlindon TE, LaValley MP, Gulin JP, Felson DT. Glucosamine and chondroitin for treatment of osteoarthritis: a systematic quality assessment and meta-analysis. *JAMA* 2000;283(11):1469-75. doi: 10.1001/jama.283.11.1469.