

Efficacy of Protocol Based Integrated Management of Chronic Sports Injuries W.S.R to Elbow Joint: A Randomised Controlled Trial

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Submission Date: 12-06-2024; Revision Date: 22-07-2024; Accepted Date: 15-08-2024.

ABSTRACT

Introduction: Owing to inadequate training, falls, overuse of specific parts, and other factors, athletes are vulnerable to a variety of injuries. Sports injuries are linked to the signs and symptoms of Bhagna, Sadyo vrana, Sandhimoksha, and Marm-abhighata. Among these, injuries to the elbow joint have been linked to Koorpara marmabhighata. Sports injuries can be prevented and treated more effectively when complementary and alternative medicine is used.

Objectives: To compare the efficacy of an integrated management protocol with standard treatment care in the management of chronic sports injuries with respect to the elbow joint. **Materials and Methods:** 30 subjects fulfilling inclusion and exclusion criteria were selected randomly and recruited for the study. For 10 days, patients in group A were treated with an integrated approach and those in group B with a standard approach. Assessment of parameters like pain, swelling, range of motion of the joints, tenderness, manual muscle testing, muscle strength, and DASH scoring were done on 0th day, 4th, 7th, and 11th day with standard parameters. Between groups results were evaluated using the Mann-Whitney U test and the independent "t" test, while within groups results were evaluated using the Wilcoxon matched paired test and the dependent "t" test. **Results:** When the assessment parameters were statistically evaluated within the groups, it was found that both groups were significant from day 0 to day 11 with *p*-values less than 0.05. When the two groups' outcomes were statistically compared, Group A (trial) out performs Group B (standard). **Conclusion:** Integrated treatment Approach and Standard treatment, both were found effective in all the parameters assessed at various time points. Integrated treatment Approach shows more effective when compared to standard group in all the parameters assessed at various time points.

Keywords: Sports injuries, Elbow joint injuries, Agnikarma, Murivenna taila, Bala-arishta, Marmani gulika, Kinesio taping, Marma-abhighata.

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INTRODUCTION

A sports injury is described as any type of injury, pain, or physical damage sustained as a result of sport, exercise, or athletic activity.^[1] Sports injuries are frequently linked

to the musculoskeletal system, which comprises muscles, bones, joints, and supporting tissues such as ligaments and tendons.^[2] Sports injuries are classified into two types: acute and chronic. Pluim *et al.*^[2] discovered an injury incidence range of 0.04 to 0.03 per 1000 hr after analysing players at all levels. The lower extremities are the area that is usually injured, followed by the upper extremity and, finally, the trunk, with average injuries ranging from 31% to 67%, 20% to 49%, and 3% to 21%. Ankle, thigh, shoulder, and elbow injuries are more prevalent.^[3] Athletes who performed overhead and arm motions were more likely to get elbow injuries,

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www.ajbls.com

DOI: 10.5530/ajbls.2024.13.51

with estimates ranging from 50% to 1-3% of the overall population. Tennis elbow, golfers elbow, throwers elbow, bursitis, and other sports-related elbow injuries are the most common.^[4]

According to Ayurveda, the aetiology, signs, and symptoms of Sadyo-Vrana (trauma), Bhagna (fractures), and Marm-abhighata (soft tissue injuries) can all be linked to sports injuries.^[5] Overuse sports injuries are often treated using the PRICER protocol (protection, rest, ice, compression, elevation, and rehabilitation).^[6] Elbow joint injuries are treated with anti-inflammatory medications, analgesics, immobilisation, corticosteroid injections, rehabilitation, and surgery. Increased analgesic use can lead to major issues in our GI tract as well as other systemic side effects, and untreated injuries can force participants to retire from their events prematurely.^[7] Both internal and external remedies, such as Lepa (medicated paste application), Bandhana (bandaging), Pichu (oil cotton swab), and various Panchakarma procedures like Abhyanga (oil massage), Snehana (oleation), Swedana (fomentation therapy), etc., should be used as a preventive measure, a treatment method, and to improve athletic performance.^[8] Assessment of the injuries and creation of a customised protocol, including physiotherapy and Ayurvedic techniques, are necessary for the effective management of sports injuries. Therefore, the goal of the current study was to assess, through an integrated approach, the effectiveness of protocol-based care of chronic sports injuries related to the elbow joint. Incorporating Ayurvedic and physiotherapy treatments with phase-wise condition assessment of sports injuries leads to improved results.

Specific objectives or hypotheses

The primary objective was to investigate an integrated protocol in the management of chronic sports injuries and the secondary objective was to compare the efficacy of an integrated management protocol with standard treatment care in the management of chronic sports injuries with respect to the elbow joint.

MATERIALS AND METHODS

Trial design

The study was a randomised clinical trial with two groups: one receiving a normal protocol with Physiotherapeutic procedures and the other receiving an integrated protocol with both Physiotherapy and Ayurvedic procedures. The treatment of 30 patients was randomly divided into 2 groups of 15 each using an online random number generator.

In addition to CTRI Registration (CTRI/2021/12/038814), institutional ethics committee permission for the study was acquired (Protocol number: BMK/20/PG/ST/2). Written consent was obtained from the patients after they had been told of the treatment's risks and benefits. Once the trial got underway, the methodology remained same. Right up until the end of the trial, there was adherence to the planned study. The CONSORT statement recommendations were followed for reporting the study's findings.

Sample size: A total of 30 patients were selected and divided into two groups (15 each).

Randomization: As part of the randomised controlled trial design, patients were randomly assigned to two groups using computer-generated random number software.

Allocation of concealment mechanism: Patients were allocated into control and trial groups at a 1:1 ratio. The patients were assigned central case registration numbers based on a randomization table generated by a computer.

Implementation: The investigators assessed the patients based on the inclusion and exclusion criteria, and the recruited patients were treated according to the randomization chart.

Binding: The trial was open labelled and no blinding was performed.

Consort Diagram

Participants and preparation of formulation

Eligibility criteria for participants

Inclusive criteria

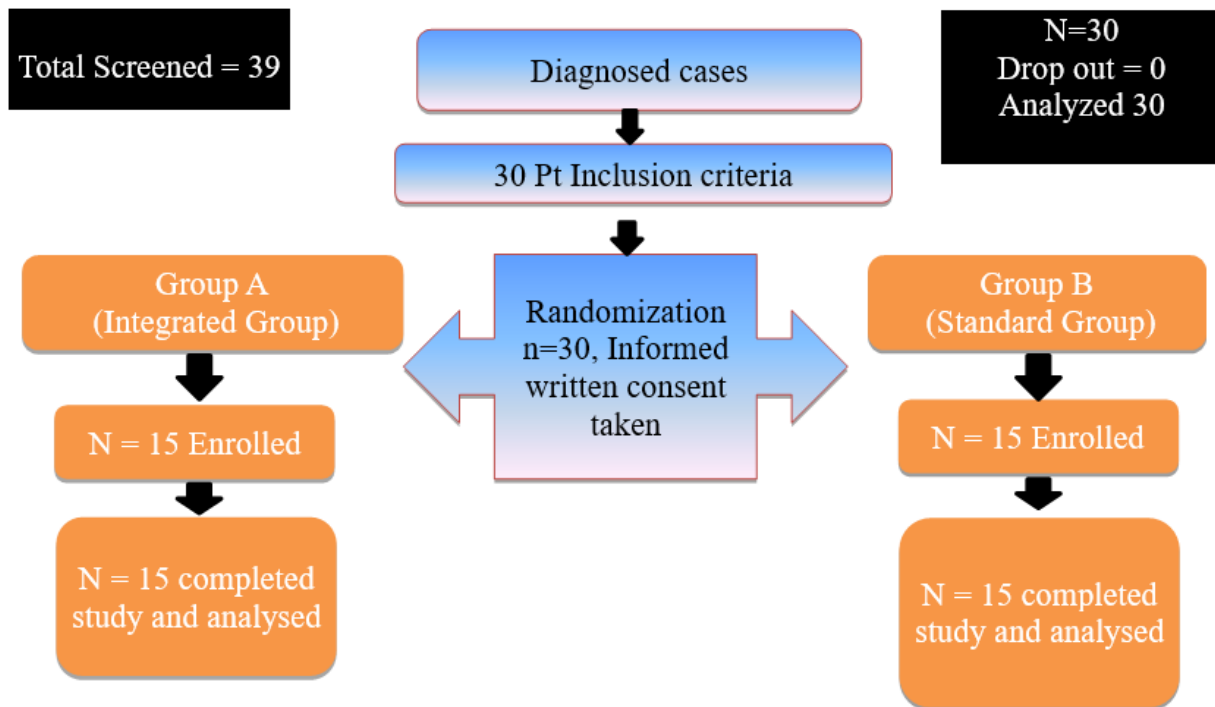
Diagnosed case of Chronic sports injuries of elbow joint with symptoms existing for more than 3 months coming under the age group of 18-50 years of either sex were selected for the study.

Exclusion criteria

Patient with symptoms due to acute injury of elbow joint and those who have systemic illnesses like diabetes, TB, cancerous lesions, or bleeding disorders or Joint deformity and fracture with partial or total displacement.

Settings and locations for the collection of the data

Enrollment for the study was open to all patients, regardless of gender, caste, or socioeconomic status, who visited the OPD and IPD departments of Shalyatantra KAHER's Shri B.M.K Ayurveda Hospital and Research Centre, Belagavi, and had chronic



sports injuries involving the elbow joint (15 patients in each group).

Raw drugs and finished products

Formulations such as Murivenna and Marmani gulika were procured from Kottakkal Arya Vaidyashala, Kerala, which had GMP certification. Balarishta was procured from KLE Ayurvedic Pharmacy, a GMP-certified pharmacy and Kinesio tapes from an internet retailer.

Intervention

30 Patients were randomly divided into two groups of 15 members each. First group of 15 members were considered as the Trial group. Ultrasound therapy was done for 5 min followed by isometric exercises (10 repetitions) followed by marmani gulika lepa for 1 hr and agnikarma (only on first day) with pancha loha shalaka. Same repetition was done for the next two days (except agnikarma), and splint bandaging was done for immobilization. 4th day started with ultrasound followed by TENS, Active resisted exercises and Kinesio taping and last bandhana with murivenna taila. 8th day started with sthanika abhyanga with murivenna taila followed by shashtika Sali panda sweda, Ultrasound therapy, TENS and active resisted exercises. Balarishta was given in BID dose of 20ml. Second group was considered as the standard group having Physiotherapy procedures including Ultrasound, Cryotherapy isometric exercises followed by rest and immobilization for first 3 days.

4th to 7th day Ultrasound, TENS, exercises and Kinesio taping was done and last 3 days, ultrasound, TENS and active resisted exercises were given.

Outcomes

Primary outcome

Standard operating procedures were used to measure a variety of parameters at various time points, including pain (by VAS, VDS), swelling (graduation of length and breadth by using inch tape), range of motion of the joints (by goniometry). Parameters like tenderness were assessed by standard grading, manual muscle testing by grading, muscle strength (by dynamometer), and DASH scoring (through standard questionnaire).

Statistical test

In order to do the statistical analysis, SPSS version 20.0 was used. The statistical analysis was performed using SPSS version 20.0. The results (within the groups) of parameters such as VAS, VDS were assessed using the Wilcoxon matched pairs test and tenderness, swelling, range of motions and DASH scoring were performed with dependent χ^2 test. The Mann-Whitney U test was used to compare the two groups at various time points for the parameters like VAS, VDS and tenderness. The statistical analysis of the tenderness, swelling, range of motions and DASH scoring test was carried out using the independent χ^2 test to compare the groups. The parameters were deemed statistically significant

if the 'p' value was 0.05, and values were presented as mean standard deviation.

RESULTS

The study was completed with the involvement of 30 patients in total, without any adverse events or dropouts being reported.

Subject characteristics

Age, Gender and Occupation

In the study in group A 60% of the total sample was under 21-30 years, followed by 13.33% under 31-40 years and 4% under 41-50 years, and in group B 66.67% under 21-30 years, 20 % under 31-40 years and 13.33% under 41-50 years. 53.33% of total population was males and 46.67 were females. 40% were students of professional colleges and the remaining includes doctors, teachers, Pvt job holders, engineers, and businessmen.

Sports involved

The majority of patients in Group-A in the current study, or 46.67% of them, are involved in tennis, 26.67% in cricket, 13.33% in table tennis, and 13.33% in badminton. There are the most patients in Group B, 40% of who play badminton, 26.67% cricket, 20% table tennis, and 13.33% tennis.

Primary Outcome

In all time points, the parameters like pain, tenderness, swelling, manual muscle test, muscular strength, and

range of motion of the elbow joint, Group A (trial) showed statistically significant results ($p < 0.05$) than group B (standard) in between group results which was assessed by Mann-Whitney U test and independent 't' test (Tables 1, 2). In within-group (Table 3) results which was assessed by Wilcoxon matched pairs test and dependent 't' test, both groups showed statistically significant results ($p < 0.05$) in all the assessed parameters at various time points i.e. on days 4, 7 and 11.

DISCUSSION

The elbow joint may be the most complex in the human body, even though it cannot bear weight. The three articulations are called the proximal radio-ulnar, radio-humeral, and ulno-humeral joints, respectively. It is not surprising, as the elbow joint is the second most often injured joint in sports-related injuries after the shoulder, with several muscles in the upper and lower arm crossing or attaching to at least one component of the joint.^[9] The human body is covered in marmas, or important points, all over its surface. These are the locations where it is believed that Prana (life energy) is located. Marmas, when handled, have the power to change the structural makeup as well as the organic processes of the body. Detailed knowledge of these Marma points is essential for an Ayurvedic practitioner since little injuries to these Marma points or anatomical locations can be lethal compared to significant injuries anywhere else in the body.^[10]

Table 1: Comparison of Group A and Group B with VAS, VDS and tenderness at different treatment time points by Mann-Whitney U test.

Parameters	Time points	Group A			Group B			Z-value	p-value
		Mean	SD	Mean rank	Mean	SD	Mean rank		
VAS	Day 0	7.73	0.59	19.13	7.00	0.85	11.87	2.2398	0.0251*
	Day 4	3.80	1.42	9.83	5.93	0.96	21.17	-3.5049	0.0005*
	Day 7	1.60	1.30	8.37	5.13	1.13	22.63	-4.4174	0.0001*
	Day 11	0.73	1.10	8.93	3.53	1.41	22.07	-4.0649	0.0001*
	Day 0 to Day 11	7.00	1.31	22.43	3.47	1.41	8.57	4.2930	0.0001*
VDS	Day 0	7.00	0.76	16.87	6.60	1.12	14.13	0.8296	0.4068
	Day 4	3.33	1.35	10.33	5.13	1.06	20.67	-3.1938	0.0014*
	Day 7	1.53	1.46	9.53	3.80	0.68	21.47	-3.6915	0.0002*
	Day 11	0.53	0.74	9.53	2.00	0.76	21.47	-3.6915	0.0002*
	Day 0 to Day 11	6.47	1.25	20.77	4.60	1.24	10.23	3.2560	0.0011*
Tenderness	Day 0	2.53	0.52	15.50	2.53	0.52	15.50	0.0000	1.0000
	Day 4	1.20	0.77	10.40	2.27	0.59	20.60	-3.1523	0.0016*
	Day 7	0.40	0.63	9.43	1.73	0.70	21.57	-3.7538	0.0002*
	Day 11	0.27	0.46	9.33	1.33	0.49	21.67	-3.8160	0.0001*
	Day 0 to Day 11	2.27	0.70	21.10	1.20	0.41	9.90	3.4634	0.0005*

Table 2: Comparison of Group A and Group B with swelling, Range of motion, manual muscle test, muscle strength, DASH score at different treatment time points by independent ‘t’ test.

Parameters	Time points	Group A		Group B		t-value	p-value
		Mean	SD	Mean	SD		
Swelling	Day 0	27.77	2.13	27.07	2.66	0.7961	0.4327
	Day 4	26.60	1.59	26.47	2.39	0.1795	0.8588
	Day 7	25.90	1.55	26.03	2.70	-0.1658	0.8695
	Day 11	25.60	1.78	25.83	2.77	-0.2743	0.7859
	Day 0 to Day 11	2.17	0.65	1.23	0.53	4.3279	0.0002*
Elbow flexion	Day 0	116.33	6.94	117.93	6.40	-0.6568	0.5167
	Day 4	133.67	6.67	126.20	6.36	3.1370	0.0040*
	Day 7	143.20	4.71	132.27	7.57	4.7484	0.0001*
	Day 11	146.13	3.68	139.53	8.44	2.7755	0.0097*
	Day 0 to Day 11	29.80	5.33	21.60	9.62	2.8871	0.0074*
Elbow extension	Day 0	17.53	6.20	16.73	3.86	0.4243	0.6746
	Day 4	9.33	5.63	14.13	4.22	-2.6422	0.0133*
	Day 7	2.53	4.61	11.73	3.86	-5.9229	0.0001*
	Day 11	0.67	2.58	9.60	3.76	-7.5897	0.0001*
	Day 0 to Day 11	16.87	6.66	7.13	2.45	5.3105	0.0001*
Elbow Supination	Day 0	67.00	5.40	62.93	8.08	1.6202	0.1164
	Day 4	77.07	5.18	66.00	7.49	4.7068	0.0001*
	Day 7	81.87	3.66	68.33	7.70	6.1495	0.0001*
	Day 11	86.93	3.79	71.07	7.24	7.5241	0.0001*
	Day 0 to Day 11	19.93	4.11	8.13	2.17	9.8290	0.0001*
Elbow Pronation	Day 0	62.00	4.75	63.87	5.46	-0.9986	0.3265
	Day 4	71.53	5.14	68.33	5.67	1.6203	0.1164
	Day 7	77.20	4.14	70.53	5.82	3.6152	0.0012
	Day 11	82.53	2.42	74.13	5.93	5.0832	0.0001*
	Day 0 to Day 11	20.53	4.58	10.27	5.59	5.5040	0.0001*
Manual Muscle Testing	Day 0	2.47	0.52	2.40	0.51	0.3568	0.7240
	Day 4	4.00	0.76	2.73	0.70	4.7500	0.0001
	Day 7	4.80	0.41	3.20	0.68	7.8161	0.0001*
	Day 11	4.93	0.26	3.60	0.51	9.0749	0.0001*
	Day 0 to Day 11	2.47	0.64	1.20	0.41	6.4363	0.0001*
Muscle Strength	Day 0	18.67	6.56	18.13	3.80	0.2724	0.7873
	Day 4	22.87	7.31	19.40	3.78	1.6322	0.1138
	Day 7	26.20	8.35	20.53	3.64	2.4088	0.0228*
	Day 11	27.80	8.33	21.53	3.31	2.7086	0.0114*
	Day 0 to Day 11	9.13	3.62	3.40	1.68	5.5596	0.0001*
DASH Score	Day 0	24.98	5.36	25.82	4.44	-0.4670	0.6441
	Day 11	8.57	3.94	19.27	4.03	-7.3606	0.0001*
	Day 0 to Day 11	16.41	4.33	6.54	0.99	8.6028	0.0001*

Kurpara marma is a vaikalyakara marma having a measurement of 3 angulas as per acharyas, and if injured, it will cause structural deformity of the particular marma. After palpating the elbow joint (medially to bicipital aponeurosis), one can feel the pulsation of the brachial artery; after stroking behind the medial

epicondyle of the humerus, one can feel tenderness and a tingling sensation; and after applying pressure, one can feel Marma, which is where Vishama Spandana is felt, according to Vagbhatacharya.

In this study, the majority of patients belonged to the age range of 21 to 30 because they participated in

Table 3: Within group results of VDS scores in Group A and Group B assessed by Wilcoxon matched pairs test and dependent 't' test.

Within group results of tenderness scores in Group A and Group B assessed by Wilcoxon matched pairs test									
Scales	Changes from	Mean Diff.	Group A (Trial)			Group B (Standard)			
			%	Z-value	p-value	Mean Diff.	%	Z-value	p-value
VAS	Day 0 – 11	7.00	90.52	3.4078	0.0007*	4.56	69.68	3.4078	0.0007*
VDS	Day 0 – 11	6.47	92.38	3.4078	0.0007*	4.60	69.70	3.4079	0.0007*
Within group results of tenderness scores in Group A and Group B assessed by dependent 't' test									
Tenderness	Day 0 – 11	2.27	89.47	3.4079	0.0007*	1.20	47.37	3.4078	0.0007*
DASH	Day 0 – 11	16.41	65.70	-7.5843	0.0001*	6.54	25.35	-4.4607	0.0005*
Swelling	Day 0 – 11	2.17	7.80	13.0000	0.0001*	1.23	4.56	9.0118	0.0001*
Elbow Flexion	Day 0 – 11	29.80	25.62	-21.6355	0.0001*	21.60	18.32	-8.6962	0.0001*
Elbow Extension	Day 0 – 11	16.87	96.20	9.8025	0.0001*	7.13	42.63	11.2967	0.0001*
Elbow Pronation	Day 0 – 11	20.53	33.12	-17.3617	0.0001*	10.27	16.08	-7.1176	0.0001*
Elbow Supination	Day 0 – 11	19.93	29.75	-18.7662	0.0001*	8.13	12.92	-14.5374	0.0001*
Manual Muscle Testing	Day 0 – 11	2.47	100.00	-14.9285	0.0001*	1.20	50.00	-11.2250	0.0001*
Muscle Strength	Day 0 – 11	9.13	48.93	-9.7644	0.0001*	3.40	18.75	-7.8296	0.0001*

sports more frequently, followed by the age range of 41 to 50 because most of them were coaches and retired athletes. The majority of patients were male, or 66.67%, compared to females, or 33.33%, because boys are more likely to participate in sports. The majority of the patients in this study came from the Hindu community, although there was no evidence linking religion to the disease.

Injuries to the elbow joint were more common in Tennis players because they experienced the most joint stress during the event, followed by those who played badminton, table tennis, and cricket. When it comes to cricket players, bowlers in particular are more impacted because they have to give more stress on elbow joint while throwing.

Agnikarma

For conveying the therapeutic heat in Agnikarma (Figure 1) operations in the past, many materials were used. This may raise questions about how to specifically target painful tissues (such as muscles, joints, tendons, and skin). In the present era, C fibres may be the targeted location. The heat energy that Agnikarma delivers acts at the level of big-diameter A beta fibres and inhibits impulses from A delta and C fibres with smaller diameters. This will result in the physiological gate of pain being closed or blocked.^[11]

Agni's Ushna Guna helps to effectively remove Avarana and stabilises Vata movement, relieving Shoola.^[12] According to other studies, therapeutic heat causes an inflammatory condition to develop at the location,

increases blood flow there, and lowers the metabolic components that cause pain. This aids in easing discomfort and aching muscular spasms.^[13]

Marmani gutika

Vidarikanda's methanolic extract was found to significantly lessen the rise in inflammatory markers caused by carrageenan, including serum C-reactive protein and lipid peroxides. One Pueraria isoflavone, puerarin, has been shown to inhibit the production of inflammatory biomarkers such as NF- κ B, TNF- α , and macrophage inflammatory protein 2 (MIP-2), as well as the expression of cyclooxygenase-2 (COX-2), CRP, and inducible nitric oxide synthase (iNOS). Moreover, anti-inflammatory and pain-relieving drugs include varahikanda, raktachandana, and pashana bheda.^[14]

Murivenna

Murivenna oil, which has coconut oil as its foundation, makes the skin more permeable, which improves the medications' absorption. The active ingredient in murivenna works in concert to alleviate the signs and symptoms of soft tissue injuries. When the individual anti-inflammatory characteristics of the murivenna (Figure 1) component were combined, these topical medicines increased the anti-inflammatory effects and helped treat soft tissue injuries.^[15]

The ethanolic extracts of Paribadra bark were found to have anti-inflammatory and antibacterial characteristics, as well as an inhibitory effect on PGE2 and TNF- α production, respectively, in cell line studies investigating their effects on acute and chronic inflammation.



Figure 1: Integrated group procedures. Group A - TRIAL GROUP (Integrated approach).

Balarishta

The chemicals responsible for the anti-inflammatory impact may be shown by the clear dose-response relationship for PGE2 and PGD2 production inhibition for the crude extract and residual fraction. Nevertheless, the remaining *S. cordifolia* fraction reduced all prostanoids, with maximum inhibitions for PGE2, PGD2, TXB2, and PGF2 of 69.08%, 73.18%, 81.87%, and 44.25%, respectively.^[16]

Physiotherapy procedures (Figures 1,2,3)

Among other physiological effects, thermal therapeutic ultrasound enhances tissue warmth, local blood flow, tissue extensibility, and decreases the viscosity of fluid elements in the tissue. Furthermore, the mechanical motions increase cellular permeability and ion transport,

which speeds up the tissue's metabolism. Therefore, therapeutic ultrasonography has been utilised to reduce pain and muscular spasm.^[17]

Muscle contractions and relaxations were performed repeatedly to control the cellular osmotic pressure balance and promote the breakdown of chemicals that cause pain in the muscle cells. By stimulating large-diameter afferents, TENS will inhibit afferent activity in large-diameter fibres that might be the source of pain.^[18] Keratinocytes may act as primary mechanical stimuli transducers that are not neural, most likely by triggering a response in neighbouring C-fibers through a signal transduction cascade mechanism. The way that Keratinocytes perceive pain may be affected by Kinesio Tapes dermal stretching. By activating a pain-inhibitory mechanism, stretching the skin during stimulation



Figure 2: Trial Group (Integrated approach).

may also stop pain from being communicated. The hypothesis of gate control suggests that the constant somatosensory input obtained via cutaneous stretching could be able to “close” the “gates” to painful input, therefore keeping pain signals from reaching the central nervous system.^[19]

Pain reduction with isometric exercise (Figures 1, 3) may result from tissue-level modifications, changes in the brain, or activation of the motor neurone pool. The Kinesio tape raises the skin upward and expands the space between the muscle and the interstitial area by creating tiny curves on the skin. Consequently, stimulation of the pain receptors beneath the skin is prevented and lymphatic circulation is accelerated. These properties allow the muscle to work harder and allow the KT to increase range of motion without producing discomfort.^[20] Because of ushna guna, it induces vasodilation and activates the sympathetic nervous system. Sara and Sukshma Guna dissolve

the lina dosha, which is subsequently expelled via the micropores.^[21]

Muscle endurance and strength can both increase with regular exercise. The efficiency with which your circulatory system delivers nutrients and oxygen to your tissues is enhanced by exercise. Your heart and lung health will also improve, giving you more energy to get through your daily responsibilities. Exercise stimulates the sympathetic nervous system, which causes the body to respond in concert to maintain a healthy level of homeostasis, despite the increased demand on one’s physical, metabolic, respiratory, and cardiovascular systems.^[22]

The common treatment procedures which are practice in Ayurveda for elbow joint injuries are snehana, upanaha, lepa, taila application, Agnikarma etc.,^[23] The treatments are planned according kurpara marm-abhighata laxanas/Snayugata vata laxanas. A recent study showed comparison of Agnikarma with snayugata protocol (Snehana, Upanaha, daha), where



Figure 3: Group B (Standard Group procedures).

agnikarma showed significant results in the parameters like pain, tenderness etc.,^[23] Previous study conducted on tennis elbow with the intervention of Ultrasound and TENS (Transcutaneous electric nerve stimulation) has showed reduction of pain assessed by VAS from 7.63 to 0.43, 6.57 to 2.81 after 5 weeks respectively.^[24] In the present study the integrated approach which included Agnikarma has shown better results.

The integrated approach is the need of the hour as society is in need of complete treatment at on place with good clinical outcomes. The results of the integrated approach can help the clinicians to plan for the treatment and provide better care to the patient and

it may also help in planning newer treatment protocols. The approaches in large sample sizes with follow-up and newer assessing techniques can help in the preparation of policies on the management of joint injuries.

Strength of the study

The study highlights the importance of an integrated approach i.e. Ayurveda and physiotherapy usage in the management of chronic elbow joint injury. An integrated approach has shown promising results in the study. The parameters which were used to assess the efficacy are taken from peer-reviewed published literature, which adds strength to the study and makes study reliable.

Limitations of the study

The sample size used to draw the conclusions for the present study is less because of certain reasons like patient availability, cost of treatment etc. Further the follow up can be increased to see its prolonged effect.

CONCLUSION

Elbow injuries from sports are not uncommon, particularly in throwing sports like baseball and tennis. Early diagnosis, prompt treatment initiation, and appropriate referrals for surgical management facilitate athletes' safe and quick return to sport. Both the standard treatment and the integrated treatment approach were found to be beneficial in this study in terms of all the criteria that were measured at different times from the baseline, including pain, tenderness, swelling, range of motion, and manual muscle testing. When compared to the standard group, the integrated treatment approach produced better results across all parameters that were evaluated at different intervals starting from the baseline. Further study in this area is necessary to provide evidence-based results and promoting integrated approach in the treatment of sports injuries.

ACKNOWLEDGEMENT

We acknowledge Dr. Suhas Kumar Shetty, Principal, KAHER'S Shri B. M. Kankanawadi Ayurveda Mahavidyalaya Shahapur, Belagavi, Karnataka.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION

All the authors provided their contributions in treating the patients. Dr Ramesh Killedar, Dr Deepti Bagewadi and Dr Harishankar involved in the collection of data. Analysis, interpretation of the data was done by all the authors. Manuscript drafting was done by Dr Ramesh Killedar, Dr Harishankar P V and review, correction of manuscript was done by Dr Pradeep Shindhe and Dr Ramesh Killedar. Approval from all the authors was provided for the submitted manuscript.

ABBREVIATIONS

VAS: Visual Analogue scale; **VDS:** Verbal descriptive scale; **DASH:** Disabilities of the Arm, Shoulder and Hand; **PRICER:** (Protection, Rest, Ice, Compression,

Elevation and Rehabilitation); **TENS:** Transcutaneous electric nerve stimulation.

SUMMARY

Sports injuries are most commonly associated with the musculoskeletal system, which includes the muscles, bones, joints and associated tissues such as ligaments and tendons. The commonest sports injuries in elbow are the Tennis elbow, Golfers elbow, Thrower's elbow, Bursitis etc. Conventional approaches to overuse sports injuries include PRICER (Protection, Rest, Ice, Compression, Elevation and Rehabilitation) protocol. Effective management of sports injuries requires assessment of injuries and preparation of special protocol by incorporating various procedures of Ayurveda and Physiotherapy for better outcomes. The prepared Protocol was tested in 30 patients, which has given significant results in all the assessed parameters like pain, swelling, range of motion etc., The study highlights the significance of integrated management in the chronic sports injuries with good clinical outcomes.

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Cite this article: Harishankar PV, Killedar RS, Bagewadi D, Shindhe PS. Efficacy of Protocol Based Integrated Management of Chronic Sports Injuries W.S.R to Elbow Joint-A Randomised Controlled Trial. *Asian J Biol Life Sci.* 2024;13(2):403-13.