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Original Article

Evaluation Of Clinical Outcome in the Management of Tennis Elbow by Multiple Puncture with Needle Technique

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ABSTRACT

Tennis elbow is one of the most common causes of elbow pain among the working class population in South India. The cause for this disease is chronic inflammation to the extensors of the wrist due to repetitive microtrauma. Management of this disease is mostly conservative, ranging from NSAID's, rest, physiotherapy, ultrasound, semi-invasive procedures like local steroid injection, multiple needle puncture, percutaneous release of common extensors and open surgical debridement in poor responders. Here we are assessing the effect of multiple needle puncture procedures in patients with Tennis elbow in whom at least one of the standard conservative procedures has failed.

MATERIALS AND METHODS: A prospective observational study was conducted in our institution from January 1st 2024 to May 30th 2024. A total of 64 patients underwent multiple needle puncture technique using 18 G needles for single sitting. The post procedure data was collected at 1 month, 3 month and 6 month interval. The outcome was graded Excellent, Good, Fair or Poor as per the Nirschl score.

RESULTS: Of the 64, 26 were females (40.6%) and 38 were males (59.4%), right elbow- 53(82.8%), left-11(17.2%), and rest pain was present in 30(46.9%). The result was Excellent in 33, Good in 19, Fair in 7 and Poor in 5 patients, i.e, 81.3% were having excellent to good results.

CONCLUSION: Multiple needle puncture procedure is a simple, safe and reproducible procedure with Excellent- Good results in patients with Tennis elbow resistant to standard conservative management even for patients with diseases like diabetes and hypothyroidism.

Keywords*: Tennis elbow, Percutaneous multiple needle puncture, 18G needle.*

INTRODUCTION

Tennis Elbow/ Lateral Epicondylitis (LE) is a chronic aseptic inflammatory condition caused by repetitive microtrauma and excessive load to the common extensors of the wrist, specially to the Extensor Carpi Radialis Brevis (ECRB). It is also known as Periostitis of the Elbow, Tendinitis of ECRB, Lateral Epicondylalgia and Radial Epicondylitis.**[1] .** This disease was described by Runge in 1873

It is estimated to affect 1-3% of the population every year in the United StatesEven though accurate statistics about our nation's disease burden are not available at present. As per Sanders et.al.**[2]** it is common among many office workers, secretaries and medical staff. In sports it is common in racket professionals who constantly overload their elbows, such as tennis, badminton, squash, gymnastics, acrobatics and weight lifting. Tennis elbow is a leading cause of loss of work hours and subsequently causes a significant dent to the economy of our nation.

In Indian conditions the people commonly affected are mechanics, artists, electricians and homemakers who require frequent repetitive moments on elbows for their daily activities. It is a very common condition in all of the Orthopedic OPs

in Kerala and Alappuzha is not an exception to it. In comparison with other states of India, Diabetes Mellitus is a common medical condition in Kerala and the usual drugs used in the treatment of TE are NSAIDs and local sterinol injections. In patients with DM and TE, both or one of the above drugs are relatively contraindicated for long term use as they may cause poor control of diabetes and subsequent renal failure. Even with the availability of multiple treatment modalities there are no single effective Treatment Procedure available for this disease So we have planned to study the effect of multiple puncture with needle technique in patients who have a failed conservative treatments for tennis elbow in the department of Orthopaedics Government Medical College Alappuzha.

Pathogenesis

It was thought to be due to a tendinitis following inflammation and was regarded as an overuse injury involving the extensors of the wrist against resistance. Histologically there is a dense population of fibroblast vascular hyperplasia and disorganized collagen which is termed as angio fibroblastic hyperplasia and is believed to be due to tendon damage by repeated microtrauma. Given the absence of inflammatory changes it is not clearly known why it should be painful. One of the postulated causes of pain is due to the local hypoxia produced by the repeated injury to the extensor tendon. In response to this hypoxia, cytokines and growth factors are released which will trigger a complex sequential cascade and subsequent neovascularization and poorly organized tendon tissue formation.

CAUSES

1. Previous trauma or repetitive trauma: sometimes patients may not be aware of the incident. Most produced by repetitive pronation/ supination movements combined with extension of elbows, as seen in racket sport professionals and in jobs requiring frequent elbow movements.
2. As a part of degeneration of tendons: as in Diabetes, Rheumatoid etc.
3. Unknown: it can occur without any recognised repetitive activity. So can be an idiopathic condition.

SYMPTOMS

Develops gradually over months

1. Pain: most common and often develops slowly, begins as mild and slowly worsens over weeks and months. There may not be a history of specific trauma in most cases. It will be located in the outer part of the elbow and sometimes maybe more at the joint.

SIGNS

- Tenderness over lateral epicondyle of elbow is the most common and first developing sign.
- **Cozen's test:** After stabilizing the elbow at 90^0 flexion, palpate the lateral epicondyle. The patient is asked to make a fist, pronate and radially deviate the forearm with extension of elbow against resistance applied by the examiner which will produce increase in pain over the lateral epicondyle. Sensitivity- 91%.
- **Maudsley's test**: It represents the degenerative activity of the origin of the extensor tendon of the wrist. In this test the examiner resists the extension of the third finger of the hand, stressing the extensor digitorum tendon. Positive test indicates pain over lateral epicondyle of the elbow. Sensitivity- 85%
- **Mill's test:** The forearm is passively pronated and the wrist is flexed and the elbow is extended to the maximum, will produce pain on lateral epicondyle.
- **Grip pain:** Most common functional limitation is grip pain which can be measured as painless grip pain and is reliable and more sensitive than grip strength. This is measured with the patient in supine position with elbow in flexion and forearm in mid prone position and asked to squeeze a dynamometer until the first appearance of pain. Averages of three consecutive readings are taken for data collection.
- **Grip strength** will worsen with increase in pain, measured by squeezing a dynamometer to the maximum. Averages of three consecutive readings are taken for data collection.

INVESTIGATIONS

1. Blood CBC, FBS/PPBS/RFT/LFT/VIRAL MARKERS 2. X-ray to exclude other pathological causes of elbow. Calcification lateral to the Lateral Epicondyle may be seen in some cases. 3. Ultrasonography: for visualization of extensor muscles, thickening and rupture of extensor tendon. 4. MRI: Most accurate assessment is done by MRI. It will show proximal muscle thickening with increased intensity in T1 and T2 weighted images and may persist for a long time even after successful treatment. Presence of large ruptures, more than 6mm in the tendons or lateral collateral ligament is associated with unsuccessful conservative management. 5. EMG and Cervico Thoracic Spinal Examination is mandatory to rule out the other causes of pain in elbows of spinal origin

TREATMENT

CONSERVATIVE

Includes rest, NSAIDS, analgesics, cortico steroids, cryotherapy, acupuncture, physiotherapy, ultrasound, laser, manual mobilization, shock waves and epicondylar strengthening and stretching exercises, epicondylar braces [**3**] etc.

In different studies it has shown that the systemic/ topical NSAID will improve the pain symptom not the arm function compared with placebo.

Local steroid injection has reported positive effects on both the pain and Arm function.

Local anesthetic injection: when compared with the steroid it has equal effects of steroid. [**4**]

II. AUTOLOGOUS BLOOD

Creaney et.al. [5] reported that growth factors from blood improves the healing process of the muscles in skeletal injuries in sports medicine. Mechanism of action is by stimulating inflammation and subsequent healing.

III. PHYSIOTHERAPY AND OTHER MODALITIES

Physiotherapy and kinetic therapy are used widely in the treatment of TE. Their usefulness ranges from acute phase of the disease to rehabilitation.
They help to preserve

1. Joint movements
2. Maintain the strength of muscles
3. Prevention of contractures

Different combinations of Physiotherapy are used in different stages of disease.
Manual therapy of elbow and wrist are useful in the rehabilitation phase after some interventional procedures. It will speed up the recovery. [**6**]

Orthosis: a variety of different orthopedic orthotics are being used. Overall, their usefulness is highly controversial. They are helpful in pain relief and improving arm function. [**7**]

Acupuncture and lasers are also used with a short term relief.

IV. SURGICAL TREATMENT
This method is opted when the conservative method fails. Debridement of ECRB and decortication of the lateral epicondyle is the procedure done. It can be of different types

1. PERCUTANEOUS TECHNIQUES

. PLATELET RICH PLASMA INJECTION (PRP)

PRP is made by using the patient's own blood. It is widely used in Orthopedics and sports medicine for the treatment of soft tissue injuries or surgical interventions.It is a potential treatment option in patients in case of failed physiotherapy. [**8**]

Mishra et al. [**9**] reported results of PRP in LE patients in his prospective cohort study of 230 patients who failed to respond to conservative treatment and underwent PRP injection showed a significant improvement in the pain compared to the control group. 71.5% v/s 56.1%
P = 0.019 with significant lowering of residual sensitivity..

PERCUTANEOUS MULTIPLE PUNCTURE NEEDLING
In1962 Loose performed the first successful percutaneous lateral condyle release with local anesthesia. It was also reported by other authors[**10 11 12 13**]. This is done as a minimally invasive procedure and is a day care procedure too.

Mechanism of action
Repeated percutaneous fenestration of the ECRB origin with dry needle promotes healing response by disrupting the chronic degenerative process by the local fibroblast proliferation. This may also release the growth factors which may in turn promote Neoangeogenesis. Its efficacy is described in the following papers. [**14 15 16 17 18 19 20**].

In most of the studies the multiple puncture needle technique for TE carries good long term results in comparison with other conservative methods. [**21 22 23 24 25 26]**. So we decided to conduct a study on the effect of multiple punctures with needle technique in TE patients of Alleppey Medical College.

Tendon needling procedure
Performed on a minor procedure room in the outpatient department by a single hand specialist. All are done in a standard manner in which the patient will be in supine position in OT table with Elbow flexed 90^0 and forearm in neutral position. After sterilizing the local area with Betadine 5%, the examiner using his thumb locates the most painful area in and around lateral epicondyle. The skin is infiltrated with 2 ml of 1% xylocaine and the Periosteum is infiltrated with 3 ml of 1%

xylocaine after the test dose using an 18G needle. Without withdrawing the needle, multiple penetrations of needle are done to the origin of ECRB, lateral epicondyle and the surrounding area for about 20 - 30 times. Fenestration of the needle is confirmed with palpation by the examiner's finger. After the procedure adhesive tapes are placed over the injection site. Active range of motion is advised as per the tolerance of pain. If the patient is already on a brace, they will be allowed to use it for 1 more week. Post procedure NSAIDS are prescribed for 5 days.

NIRSCHL SCORING SYSTEM FOR ASSESSMENT OF TENNIS ELBOW [27]

PAIN SCORE

Pain score	Total 40
At rest	10
On stretching	10
Pressure Pain	10
Chair test	10

FUNCTIONAL SCORE

Functional score	Total 30
Pain at rest	10
Pain at ADL	10
Pain at night	10

STRENGTH SCORE

Strength score	Total 20
Grip strength	10
Flexion extension strength	10

Range of elbow motion- 10
Total score = 100

Post procedure score greater than 80 - excellent
>60 - good
>50 - fair
<50 - poor [27]

Evaluation

The outcomes are going to be assessed by the same hands which had performed the above mentioned procedures. Assessment will be done at the base line (i.e. pretreatment) 3months and 6 months after the procedure.

MATERIALS AND METHOD

- **Study design**: Prospective Observational study.
- **Study duration:** 1 year after the clearance from institutional ethics committee clearance.
- **Study setting**: Govt. TD Medical College Alappuzha.
- **Sampling method:** Consecutive Sampling
- **Sample size calculation:**

Sample size is calculated using the formula with the help of N Master software

$$n= Z^2_{(1-\alpha/2)} P(1-P)/d2$$

The sample size was adjusted for finite population given by

$$N_{Finite} = F X n$$

Where F=1/ 1+ n/population
P= Expected population taken as 70%
d = Absolute precision given as 5%
1-α /2 = desired confidence level 95%
N =population size taken as 50
Applying all the values in the equation the final sample size obtained as 43

Samples are calculated from patients with Tennis Elbow in the orthopedic OPD of Govt. T D Medical College Alappuzha during the study period who are willing to undergo the said procedures.

- **Inclusion and Exclusion Criteria**

Inclusion criteria.

1. Pain resistant to at least two conservative modes of treatment (physiotherapy, splints, NSAIDS, separately studied local steroid injection).
2. Continuous symptoms for at least 2 months.
3. Age more than 18 years

Exclusion criteria

1. H/o major trauma or operation to the elbow.
2. Presence of local infection.
3. Uncontrolled DM.
4. H/o local steroid injection within 8 weeks.
5. Not willing to give consent for study and follow up.

ASSESSMENT

- EARLY- AT THE END OF THIRD MONTH AND SIXTH MONTH

Pain: assessed using Visual Analogue scale (VAS).

1. Tenderness in response to maximum pressure by the examiner's thumb to the lateral epicondyle (VAS 1-10). Patient sitting in a chair with elbow in 90^0 flexion and forearm in neutral position.
2. Grip pain measured using a dynamometer. Readings are taken at the starting of pain and an average of three consecutive values are taken.
3. Grip Strength of both hands using a dynamometer is measured. The maximum pressure that can be exerted in a dynamometer is measured. Average is taken of three consecutive values.

Successful treatment is determined as a reduction of greater than 25% - 50% baseline pain VAS score And 25%- 50% increase in the grip strength

Evaluation is done by assessing the Functional and Nirschl Score. The Functional outcomes are Pain

1. Function
2. Patient satisfaction
3. Range of movement

Complete remission of TE is considered when pain VAS score- 0 at 12 months.
Grip strength >90% of that of the opposite limp/ baseline value.

DATA ANALYSIS

Data will be entered in Microsoft excel sheet and will be analyzed using Statistical Package for Social Sciences (SPSS) version20 .All the qualitative variables will be expressed as frequency as percentage and quantitative variables as means and standard deviation or median with Q1,Q3 Appropriate statistical tests will be used to finding the association.Student t test for association between quantitative variables and Chi square test for finding association between qualitative variables with the outcome .For stating significance p value less than 0.05 is considered.Regression analysis is done to find out predictors of outcome

RESULT

Occupation	**Frequency**	**Percentage**
Farmer	1	1.6
House wife	20	31.3
Manual labour	21	32.8
Office staff	6	9.4
Shop employer	9	14.1
Tailor	5	7.8
Work shop	2	3.1
Total	**64**	**100.0**

The above table shows that 32.8% of patients were manual labourers, 31.3% were housewives, 14.1% were shop employees, 9.4% were office staff, 7.8% were tailors, 3.1% were working in a workshop shop, and 1.6% were farmers.

Age Group	**Frequency**	**Percentage**
20-40 years	31	48.4
41-60 years	33	51.6
Total	**64**	**100.0**

About 51.6% of patients belonged to the age group of 41-60 years, and 48.4% belonged to 20-40 years.The mean age was 40.72 ± 7.052. The minimum age was 28, and the maximum age was 56.

Gender	Frequency	Percentage
Female	26	40.6
Male	38	59.4
Total	**64**	**100.0**

Among them, 59.4% were males and 40.6% were females.

Side	Frequency	Percentage
Left	11	17.2
Right	53	82.8
Total	**64**	**100.0**

The majority (82.8%) had a problem in the right side of the elbow.

Rest Pain	Frequency	Percentage
Absent	34	53.1
Present	30	46.9
Total	**64**	**100.0**

Rest pain was absent in 53.1% patients and were present in 46.1%

Night Pain	Frequency	Percentage
Absent	6	9.4
Present	58	90.6
Total	**64**	**100.0**

Night pain was present in 90.6% and absent in 9.4% patients.

Diabetes	Frequency	Percentage
Absent	50	78.1
Present	14	21.9
Total	**64**	**100.0**

Diabetes was present in 21.9% and absent in 78.1% patients.

Hypothyroid	Frequency	Percentage
Present	14	21.9
Absent	50	78.1
Total	**64**	**100.0**

Hypothyroidism was present in 21.9% and absent in 78.1% patients.

Addiction	Frequency	Percentage
Alcohol	23	35.9
Smoker	1	1.6
Nil	40	62.5
Total	**64**	**100.0**

The majority (62.5%) had no addiction, 35.9% had addiction to alcoholism, and 1.6% to smoking.

3rd month

Cozen's Test	Frequency	Percentage
Negative	32	50.0
Positive	32	50.0
Total	**64**	**100.0**

Post operation 50% showed negative Cozen's test.

Mill's Test	Frequency	Percentage
Negative	12	18.8
Positive	52	81.3
Total	**64**	**100.0**

Mill's test was positive in 81.3% patients and negative in 18.8% after 3 months.

Maudsley's Test	Frequency	Percentage
Negative	1	1.6
Positive	63	98.4
Total	**64**	**100.0**

Maudsley's test was positive in 98.4% and negative in 1.6% after 3 months.

6 th month

Cozen's Test	Frequency	Percentage
Negative	52	81.2
Positive	12	18.8
Total	**64**	**100.0**

Cozen's test was negative in 81.2% of patients and positive in 18.8% of patients after 6 months.

Mill's Test	Frequency	Percentage
Negative	39	60.9
Positive	25	39.1
Total	**64**	**100.0**

Mill's test was negative in 60.9% and positive in 39.1% after 6 months.

Maudsley's Test	Frequency	Percentage
Negative	19	29.7
Positive	45	70.3
Total	**64**	**100.0**

Maudsley's test was positive in 70.3% and was negative in 29.7% patients after 6 months.

NIRSCHL Score	Frequency	Percentage
Poor	63	98.4
Fair	1	1.6
Total	**64**	**100.0**

NIRSCHL Score was poor in 98.4% patients before the procedure and fair in 1.6%.

NIRSCHL Score @ 1 month	Frequency	Percentage
Poor	34	53.1
Fair	21	32.8
Good	9	14.1
Total	**64**	**100.0**

NIRSCHL Score was poor in 53.1% of patients after 1 month, fair in 32.8%, and good in 14.1% after 1 month.

NIRSCHL Score @ 3 months	Frequency	Percentage
Poor	11	17.2
Fair	10	15.6
Good	31	48.4
Excellent	12	18.8
Total	**64**	**100.0**

NIRSCL Score was excellent in 18.8%, good in 48.4%, fair in 15.6% and poor in 17.2% patients after 3 months.

NIRSCHL Score @ 6 months	Frequency	Percentage
Poor	5	7.8
Fair	7	10.9
Good	19	29.7
Excellent	33	51.6
Total	**64**	**100.0**

NIRSCHL Score was excellent in 51.6%, good in 29.7%, fair in 10.9%, and poor in 7.8% of patients after 6 months.

NIRSCHL Score	N	Mean	Std. Deviation	Mean Rank	Friedman Test (value)	P value	Significance
Preop	64	27.17	7.137	1.00	192	<0.001	**Significant**
1 month	64	47.17	11.667	2.00			
3 months	64	64.59	14.697	3.00			
6 months	64	79.34	16.453	4.00			

P value <0.05 (Significant)
The above table shows that there is a significant difference in improvement of score on follow up through preop, 1 month, 3 months and 6 months after the procedure.

We rejected the null hypothesis of the Kolmogorov-Smirnov (KS) test for all groups and dimensions, indicating a non-normal data distribution, likely due to small sample sizes. We chose the Friedman Test for those comparisons due to its suitability for non-normally distributed data.

NIRSCHL SCORE	Mean	N	Std. Deviation	Paired differences	T Value	P value	Significance
Preop	27.17	64	7.137	20±7.017	22.802	<0.001	**Significant**
Postop at 1 month	47.17	64	11.667				

As the data is normally distributed, paired t-test was applied and a significant difference was found between preop and postop procedure after 1 month.

Pain Score	N	Mean	Std. Deviation	Mean Rank	Friedman Test (value)	P value	Significance
Preop	64	9.44	.732	4.00	189.642	<0.001	**Significant**
1 month	64	6.50	1.098	2.98			
3 months	64	3.98	1.496	1.98			
6 months	64	1.86	1.745	1.03			

The above table shows that there is a significant decrease in pain score on follow up through preop, 1 month, 3 months and 6 months after the procedure

Grip Strength	N	Mean	Std. Deviation	Mean Rank	Friedman Test (value)	P value	Significance
1 month	64	53.20	11.662	1.01	126.024	<0.001	**Significant**
3 months	64	67.58	11.885	2.02			
6 months	64	80.03	13.490	2.98			

The above table shows that there is a significant difference in improvement of grip strength on follow up through 1 month, 3 months, and 6 months after the procedure.

Flexion movement	N	Mean	Std. Deviation	Mean Rank	Friedman Test (value)	P value	Significance
Preop	64	125.78	18.327	1.45	130.923	<0.001	**Significant**
1 month	64	133.05	15.161	2.15			
3 months	64	138.83	12.304	2.91			
6 months	64	143.36	8.911	3.48			

The above table shows that there is a significant difference in improvement in movement on follow-up through preop, 1 month, 3 months, and 6 months after the procedure.

Diabetes	NIRSCHL Score	
	Poor	Fair
No	50(100%)	0
Yes	13 (92.9%)	1 (7.1%)

Chi-square value: 3.628, P value (Fisher's Exact test): 0.219

Before the procedure, 92.9% of diabetes patients had a poor NIRSCL score. There was no significant association between Diabetes and non-diabetic patients based on NIRSCHL Score/ Severity of Tennis elbow.

Hypothyroid	NIRSCHL Score	
	Poor	Fair
Yes	14(100%)	0
No	49 (98%)	1 (2%)

Chi-square value- 0.284, P value (Fisher's Exact test)- 1.00

Before the procedure, 100% of hypothyroid patients had a poor NIRSCL score. There was no significant association between hypothyroid and non-hypothyroid patients based on NIRSCHL Score/ Severity of Tennis elbow.

Diabetes	NIRSCHL Score				Total
	Poor	Fair	Good	Excellent	
No	3(6%)	3(6%)	16(32%)	28(56%)	50(100%)
Yes	2(14.3%)	4(28.6%)	3(21.4%)	5(35.7%)	14(100%)
Total	5(7.8%)	7(10.9%	19(29.7%)	33(51.6%)	64(100%)

Chi-square value-7.34, P value (Fisher's Exact test)- 0.057

After the procedure at 6 months, 35.7% of diabetic patients had excellent results, 21.4% had good results, 28.6% had fair results, and 14.3% had poor results. Among non-diabetics, 56% had excellent results and only 6% had poor results. But there was no significant difference in results between diabetic and non-diabetic patients based on NIRSCHL Score.

Hypothyroid	NIRSCHL Score				Total
	Poor	Fair	Good	Excellent	
Yes	4(28.6%)	3(21.4%)	4(28.6%)	3(21.4%)	14(100%)
No	1(2%)	4(8%)	15(30%)	30(60%)	50(100%)
Total	5(7.8%)	7(10.9%	19(29.7%)	33(51.6%)	64(100%)

Chi-square value-14.85, P value (Fisher's Exact test)- 0.002
After the procedure at 6 months, 21.4% of hypothyroid patients had excellent results, 28.6% had good result, 21.4% had fair results, and 28.6% had poor results. Among non-hypothyroid, 60% had excellent results and only 2% had poor results. There was significant difference in results between hypothyroid and non-hypothyroid patients based on NIRSCHL Score after the procedure.

Addiction	NIRSCHL Score	
	Poor	Fair
Nil	39(97.5%)	1(2.5%)
Alcohol	23(100%)	0
Smoking	1(100%)	0

Before the procedure, 97.5% of patients without addiction and 100% of alcoholics and smokers had a poor NIRSCL score.

DISCUSSION

According to the current study majority of patients had excellent to good results following the procedure based on NIRSCHL score. There were no complications following the procedure.

The mean age was 40.72 ± 7.052. The minimum age was 28, and the maximum age was 56. Among them, 59.4% were males and 40.6% were females. Similarly, a study conducted by Sanders TL Jr et.al. showed that the mean ± SD age at diagnosis was 47 ± 11 years and was the same in male and female patients. (2) . In another study by Dunn JH et.al., the mean age of the study group was 46 years (range, 23-70 years) with 45 men and 38 women. (27)

The most common professions were manual labourers (32.8%) and housewives (31.3%), followed by shop employees, office staff, tailors, and farmers. But a study conducted by Sanders TL Jr et.al. showed that the most common professions in the 10% sample were office workers/secretaries, followed by health care workers, mostly nurses. (2) This difference might be due to the different population in the two studies and the professions chosen by them.

In the present study the majority (82.8%) had a problem in the right side of the elbow. Similarly study conducted by Sanders TL Jr et.al. showed that the right elbow was more likely to be affected than the left elbow (63% vs 25%), and 12% of patients had both elbows affected. (2)

The preoperative Maudsley's score was positive in all cases, and after 6 months, it became negative in 29.7% (19 cases) of patients. According to a study conducted by Cho BK et.al. the preoperative Maudsley score was acceptable in 6 cases, and Poor in 36 cases, which was changed to Excellent in 23 cases, Good in 16 cases, and Fair in 3 cases after surgery. (13)

There was a significant decrease in pain score, and a significant difference in improvement of grip strength was found on follow-up through 1 month, 3 months, and 6 months after the procedure. Similar to the present study, a study conducted by Hsieh LF et al. showed that, within-group comparison VAS for pain decreased significantly at 2 weeks and 2 months after treatment in both groups, and a significant increase in grip strength was found after treatment in both groups (4)

There was a significant difference in improvement of NIRSCHL score on follow-up through preop, 1 month, 3 months, and 6 months after the procedure, from a mean score of 27.17 to 79.34. Results were Excellent in 33, Good in 19, Fair in 7, and Poor in 5 patients, i.e, 81.3% Good to Excellent results were achieved. Similarly, in a study conducted by Dunn JH et.al., the mean Nirschl tennis elbow score improved from 23.0 to 71.0. Results were rated as Excellent in 71 elbows, Good in 6 elbows, Fair in 9 elbows, and Poor in 6 elbows by the Nirschl tennis elbow score, and about 84% Good to Excellent results were achieved. (27)

A significant difference in improvement in movements was observed on follow-up through pre-op, 1 month, 3 months, and 6 months after the procedure. A study conducted by Nazar M et al. showed that all patients had a full range of motion at the elbow, and all patients with excellent or good results returned to their former activities without any restriction after the percutaneous Tennis elbow release procedure.(10) Thus, the procedures help in the recovery of Tennis elbow.

In the present study, there were no complications following the procedure. Similarly, in a study conducted by Barnes DE et.al. no procedural complications occurred. (22) This indicates that the procedure is safe to conduct.

WEAKNESS OF STUDY

1. Small sample size
2. Short follow up duration

ETHICAL CONSIDERATIONS

After obtaining clearance from the research council, the protocol got clearance from the ethical committee. Prior approval was obtained from the ethics committee of our institute and a written informed consent from all the patients in their mother tongue. Participant information sheets were given to all the study subjects in their native language informing them about the procedure involved, also making them aware that they can withdraw from the study any time they want and that this study would in no way influence the management in the hospital in a negative way. No financial assistance has been received from any person or agencies for the conduct of this study.

CONCLUSION

Multiple needle puncture procedure is a simple, safe and reproducible procedure with Excellent- Good results in patients with Tennis elbow resistant to standard conservative management even for patients with diseases like diabetes and hypothyroidism.

REFERENCES

1. Karabinov V, Georgiev GP. Lateral epicondylitis: New trends and challenges in treatment. World J Orthop. 2022 Apr 18;13(4):354-364. doi: 10.5312/wjo.v13.i4.354. PMID: 35582153; PMCID: PMC9048498.
2. Sanders TL Jr, Maradit Kremers H, Bryan AJ, Ransom JE, Smith J, Morrey BF. The epidemiology and health care burden of tennis elbow: a population-based study. Am J Sports Med. 2015;**43**:1066–1071.
3. Bisset L, Coombes B, Vicenzino B. Tennis elbow. BMJ Clin Evid. 2011;**2011**
4. Hsieh LF, Kuo YC, Lee CC, Liu YF, Liu YC, Huang V. Comparison Between Corticosteroid and Lidocaine Injection in the Treatment of Tennis Elbow: A Randomized, Double-Blinded, Controlled Trial. Am J Phys Med Rehabil. 2018;**97**:83–89.
5. Creaney L, Wallace A, Curtis M, Connell D. Growth factor-based therapies provide additional benefit beyond physical therapy in resistant elbow tendinopathy: a prospective, single-blind, randomised trial of autologous blood injections versus platelet-rich plasma injections. Br J Sports Med. 2011;**45**:966–971.

6. Nourbakhsh MR, Fearon FJ. The effect of oscillating-energy manual therapy on lateral epicondylitis: a randomized, placebo-control, double-blinded study. J Hand Ther. 2008;**21**:4–13; quiz 14.
7. Faes M, van den Akker B, de Lint JA, Kooloos JG, Hopman MT. Dynamic extensor brace for lateral epicondylitis. Clin Orthop Relat Res. 2006;**442**:149–157.
8. Le ADK, Enweze L, DeBaun MR, Dragoo JL. Current Clinical Recommendations for Use of Platelet-Rich Plasma. Curr Rev Musculoskelet Med. 2018;**11**:624–634.
9. Mishra A, Pavelko T. Treatment of chronic elbow tendinosis with buffered platelet-rich plasma. Am J Sports Med. 2006;**34**:1774–1778.
10. Nazar M, Lipscombe S, Morapudi S, Tuvo G, Kebrle R, Marlow W, Waseem M. Percutaneous tennis elbow release under local anaesthesia. Open Orthop J. 2012;**6**:129–132.
11. Grundberg AB, Dobson JF. Percutaneous release of the common extensor origin for tennis elbow. Clin Orthop Relat Res. 2000:137–140.
12. Kaleli T, Ozturk C, Temiz A, Tirelioglu O. Surgical treatment of tennis elbow: percutaneous release of the common extensor origin. Acta Orthop Belg. 2004;**70**:131–133.
13. Cho BK, Kim YM, Kim DS, Choi ES, Shon HC, Park KJ, Lee EM. Mini-open muscle resection procedure under local anesthesia for lateral and medial epicondylitis. Clin Orthop Surg. 2009;**1**:123–127.
14. Herquelot E, Bodin J, Roquelaure Y, Ha C, Leclerc A, Goldberg M, Zins M, Descatha A. Work-related risk factors for lateral epicondylitis and other cause of elbow pain in the working population. Am J Ind Med. 2013;**56**:400–409.
15. Coonrad RW, Hooper WR. Tennis elbow: its course, natural history, conservative and surgical management. J Bone Joint Surg Am. 1973;**55**:1177–1182.
16. Le Huec JC, Schaeverbeke T, Chauveaux D, Rivel J, Dehais J, Le Rebeller A. Epicondylitis after treatment with fluoroquinolone antibiotics. J Bone Joint Surg Br. 1995;**77**:293–295.
17. Workcover Queensland. Workcover Queensland annual report 2012-2013. Brisbane Qld, Australia, 2013.
18. Smidt N, Lewis M, VAN DER Windt DA, Hay EM, Bouter LM, Croft P. Lateral epicondylitis in general practice: course and prognostic indicators of outcome. J Rheumatol. 2006;**33**:2053–2059.
19. Rompe JD, Overend TJ, MacDermid JC. Validation of the Patient-rated Tennis Elbow Evaluation Questionnaire. J Hand Ther. 2007;**20**:3–10; quiz 11.
20. Poltawski L, Watson T. Measuring clinically important change with the patient rated tennis elbow evaluation. Hand Ther. 2011;**16**:52–57.
21. Stenhouse G, Sookur P, Watson M: Do blood growth factors offer additional benefit in refractory lateral epicondylitis? A prospective, randomized pilot trial of dry needling as a stand-alone procedure versus dry needling and autologous conditioned plasma. Skeletal Radiol 2013; 42: 1515–1520. PMID:23912197, DOI:10.1007/s00256-013-1691-7
22. Barnes DE, Beckley JM, Smith J: Percutaneous ultrasonic tenotomy for chronic elbow tendinosis: a prospective study. J Shoulder Elbow Surg 2015; 24: 67–73. PMID:25306494, DOI:10.1016/j.jse.2014.07.017
23. McShane JM, Nazarian LN, Harwood MI: Sonographically guided percutaneous needle tenotomy for treatment of common extensor tendinosis in the elbow. J Ultrasound Med 2006; 25: 1281–1289. PMID:16998100, DOI:10.7863/jum.2006.25.10.1281
24. McShane JM, Shah VN, Nazarian LN: Sonographically guided percutaneous needle tenotomy for treatment of common extensor tendinosis in the elbow: is a corticosteroid necessary? J Ultrasound Med 2008; 27: 1137–1144. PMID:18645071, DOI:10.7863/jum.2008.27.8.1137
25. Mishra AK, Skrepnik NV, Edwards SG, Jones GL, Sampson S, Vermillion DA, Ramsey ML, Karli DC, Rettig AC: Efficacy of platelet-rich plasma for chronic tennis elbow: a double-blind, prospective, multicenter, randomized controlled trial of 230 patients. Am J Sports Med 2014; 42: 463–471. PMID:23825183, DOI:10.1177/0363546513494359
26. Lakhey S, Mansfield M, Pradhan RL, Rijal KP, Paney BP, Manandhar RR: Percutaneous extensor tenotomy for chronic tennis elbow using an 18G needle. Kathmandu Univ Med J (KUMJ) 2007; 5: 446–448. PMID:18604073
27. Dunn JH, Kim JJ, Davis L, Nirschl RP: Ten- to 14-year follow-up of the Nirschl surgical technique for lateral epicondylitis. Am J Sports Med 2008; 36: 261–266. PMID:18055917, DOI:10.1177/0363546507308932