

The background of the cover is a collage of various anatomical illustrations. It includes several full-body figures showing different systems like muscles, bones, and internal organs. There are also detailed drawings of specific parts such as hands, feet, a brain, a heart, a kidney, and a cross-section of a joint. The illustrations are in various colors and styles, some appearing as medical diagrams and others as more artistic representations. The overall theme is medical and anatomical.

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# Socio-demographic determinants of scabies and association of scabies with other diseases: A cross-sectional study from rural India

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## ABSTRACT

**Background:** Scabies is a parasitic disease caused by a mite called *Sarcoptes scabiei*. It is a public health problem in developing countries including India. The present study was planned to assess the prevalence of scabies among different socio-demographic groups and to find out the association of scabies with other diseases related to unhygienic environments.

**Materials and Methods:** The study was conducted among children aged 6–14 years in a rural area of West Bengal, India. It was a community-based cross-sectional study. The children underwent medical checkups to assess the presence of scabies, diarrhea, boil, ringworm infestation, eczema, and respiratory tract infections. Stool examination was performed to assess the presence of amoebiasis and giardiasis. History was taken from the mothers about the occurrence of diarrhea and respiratory tract infections in last 15 days. After data collection, it was compiled, tabulated and analyzed in SPSS version 16.0.

**Results:** The overall prevalence of scabies was found to be 42%. The prevalence of scabies was significantly higher among with low per capita monthly income and among children with a larger number of siblings. The prevalence of scabies was significantly higher among children whose mothers were illiterate. Scabies was significantly associated with diarrhea, amoebiasis, giardiasis, boil, ringworm infestation, and respiratory tract infections.

**Conclusion:** The present study revealed the socio-demographic factors associated with scabies and also indicates that the diseases which are related to unhygienic conditions are also associated with scabies.

**Key words:** Scabies, *Sarcoptes scabiei*, Unhygienic condition

## INTRODUCTION

Scabies is a contagious skin infection caused by a mite named *Sarcoptes scabiei*. The World Health Organization (WHO) has classified scabies as a water-borne disease. Scabies is very common in India.<sup>1</sup> The prevalence of scabies is high particularly during the winter season as described by Sokolova et al.<sup>2</sup> The prevalence of scabies is also very high in some areas (according to Andrews et al.<sup>3</sup> and McDonald et al.<sup>4</sup>). The approximate number of infected people around the world is estimated to be near about 300 million according to Chosidow.<sup>5</sup> The prevalence varies widely from country to country and it ranges from 0.2% to 24% according to a review done by the WHO.<sup>6</sup> One study from a rural Indian village in 1977 found the prevalence to be as high as 70% as described by Nair et al.<sup>1</sup>

Scabies is often associated with secondary bacterial infection by *Streptococcus* and *Staphylococcus aureus* and sometimes it is associated with pyoderma as described by WHO in 2005.<sup>7</sup> Many social factors are associated with scabies. Overcrowding and climate change are often considered to be associated with scabies as described by a study from New Zealand by Andrews and another study conducted in Edinburgh by Savin.<sup>8,9</sup> Christophersen also reported similar findings in Denmark.<sup>10</sup> The highest rates of scabies in developing countries are seen in pre-school children and adolescents as described by Burkhart et al.<sup>11</sup> In this context, the present study was conducted in a rural area of India to assess the prevalence of scabies among different socio-demographic groups and to find out the association of scabies with other diseases related to unhygienic environments.

## MATERIALS AND METHODS

The study was conducted in Rasulpur village of Singur block of Hooghly district, West Bengal, India. The area is situated in eastern India and the village is approximately 50 km away from the metropolitan city of Kolkata. Majority of people are farmers and laborers in this village. A large group of people go to Kolkata every day for earning their livelihood. A majority of the population is Muslim and belongs to the lower middle or upper lower socioeconomic status according to the Prasad Scale.

It was a community-based cross-sectional study. The study included children aged 6–14 years since they are school going children and get a chance to mix with other children in school which is very important as far as a contagious disease like scabies is concerned. A total of 200 children in this age group were included in the present study. A total line list of children aged 6–14 years was taken from local Panchayat. In the line list, all children were given a code number starting with 1. These children were selected from the line list by a systematic random sampling technique. The study was conducted for two months in the year 2014 from November to December. Institutional Ethics Committee clearance was taken before conduction of the study.

The children underwent a medical checkup done by a registered medical practitioner who is also the principal investigator of this study. Any medical condition detected was treated with appropriate prescription by the principal investigator. After thorough medical checkup, the mothers of the children were asked some questions using a predesigned, pretested schedule. Then, they were given containers for collection of stool specimens. Stool specimens were collected the next day and examined in the laboratory for ovum, parasite, and cysts. Data were collected regarding the presence of scabies as well as other diseases like diarrhea, amoebiasis, giardiasis, boil, eczema, ringworm infection, upper, and lower respiratory tract infections.

After data collection and checking the clean data, a sheet was generated in SPSS version 16.0 and analysis was done on this software.

## RESULTS

The present study included 200 children in the age group of 6–14 years with a mean age of 9.5 years and standard deviation of 2.1 years. Briefly, 52% of the children were male and 48% were female. Majority (62%) of the children were Muslim and 38% were Hindu, as shown in Table 1. Socio-economic status was assessed according to modified Prasad's scale and it was seen that majority of the study group was either from lower middle (28%) or upper lower (39%) or lower (22.5%) group. Only 3% belonged to the upper socio-economic status and 7.5% belonged to the upper middle socio-economic status. The level of literacy of the mothers of the children was also taken into consideration and it was found that 41% mothers were illiterate and the remaining 59% were literate. Mothers were asked about the number of children they had. It is revealed that 5.5% of the study group children did not have any sibling, 29.5% had one sibling, 30.5% had two siblings and 34.5% had more than two siblings.

**Table 1: Socio-demographic characteristics of the study group**

Parameters	Number	Percentage
<i>Sex</i>		
Male	104	52.0
Female	96	48.0
<i>Religion</i>		
Hindu	76	38.0
Muslim	124	62.0
<i>Socio-economic status</i>		
Upper	6	3.0
Upper-middle	15	7.5
Lower-middle	56	28.0
Upper-lower	78	39.0
Lower	45	22.5
<i>Mother's literacy</i>		
Illiterate	82	41.0
Literate	118	59.0
<i>Presence of siblings</i>		
No	11	5.5
One	59	29.5
Two	61	30.5
More than two	69	34.5

Table 2 highlights the prevalence of scabies and other diseases which are related to unhygienic conditions or water-borne infections. It is revealed that 42% of the children in the study group had scabies at the time of study. The history of 24.5% of the children showed that they had suffered from diarrhea within last 15 days. In total, 75.5% children had amoebiasis during the study and 13% had giardiasis. Skin conditions other than scabies were also checked for. Boils were present in 44% children. 38% children were suffering from ringworm infection at the time of study and 13% children were suffering from eczema. In total 20.5% children had suffered from respiratory tract infections within the last 15 days before study.

The present study did not find any significant change in prevalence of scabies with change in age. However, scabies was significantly more prevalent among children belonging to families with less per capita monthly income ( $p=0.003$ ) as shown in Table 3. With the increase in the per capita income, scabies prevalence decreased significantly. There is a significant increase in prevalence of scabies with the increase in the number of siblings ( $p=0.007$ ).

Association of prevalence of scabies with different socio-demographic parameters is shown in Table 4. The prevalence of scabies was not significantly different between boys and girls ( $p=0.227$ ) and between different religions ( $p=0.673$ ). However, the prevalence was significantly high among children of illiterate mothers as compared to literate mothers ( $p<0.001$ ).

**Table 2: Prevalence of different diseases**

Diseases	Number	Percentage
<i>Scabies</i>		
Yes	84	42.0
No	116	58.0
<i>Diarrhea in last 15 days</i>		
Yes	49	24.5
No	151	75.5
<i>Amoebiasis</i>		
Yes	121	60.5
No	79	39.5
<i>Giardiasis</i>		
Yes	26	13.0
No	174	87.0
<i>Boil</i>		
Yes	88	44.0
No	112	56.0
<i>Ring worm infection</i>		
Yes	76	38.0
No	124	62.0
<i>Eczema</i>		
Yes	26	13.0
No	174	87.0
<i>Respiratory tract infection in last 15 days</i>		
Yes	41	20.5
No	159	79.5

Scabies was significantly associated with the presence of other diseases. Children having a history of diarrhea episodes within last 15 days had significantly more prevalence of scabies as compared to others ( $p<0.001$ ). The presence of amoebiasis and giardiasis were assessed by stool examination. Scabies was found to be significantly associated with amoebiasis ( $p<0.001$ ) and giardiasis ( $p=0.005$ ). Children were examined for the presence of any ringworm infection. It was observed that children having ringworm infection

had significantly high prevalence of scabies as compared to other group ( $p<0.001$ ). However, the association between eczema and scabies was not found to be clinically significant ( $p=0.053$ ). Medical checkups were done as well as histories were studied for the presence of respiratory tract infections (lower or upper) on the day of the study or within last 15 days. It was seen that prevalence of scabies was significantly high among children who suffered from respiratory tract infections at that time or within last 15 days.

## DISCUSSION

Scabies, a contagious disease, along with the associated itching is not only a medical but also a social problem. Sometimes children with scabies are neglected by their friends and are not allowed to participate in playing groups. This creates a feeling of loneliness and depression among children. Often, the treatment is not done in a proper way and family members are not treated which results in recurrence of the problem.

The present study found very high prevalence (42%) of scabies among children aged 6–14 years. This finding is less than that revealed by Nair et al. in 1977.<sup>1</sup> One study was conducted by Steer et al. in 2009 among 5–14 years old children in Fiji which found scabies prevalence of 18.5%.<sup>12</sup> Yap et al. conducted a study in a secondary boarding school in Malaysia among adolescents aged 13–17 years in 2009 and found that 8.1% children had scabies.<sup>13</sup> In Nigeria in 2005, Ogurbiyi et al. found the prevalence of scabies among rural children aged 4–15 years to be 4.7%.<sup>14</sup> Sharma et al. conducted a study in India in 1984 in a rural community and they found scabies was present among 13% of the general population.<sup>15</sup> Another Indian study by Gulati et al. in semi-urban community of Goa has found that 9.7% of the population was infected with scabies.<sup>16</sup> However, in recent times there has been a paucity of study on scabies in India, though the prevalence is still high. The present study found that scabies is significantly more prevalent in people with a low economic status. Low income groups usually live in unhygienic conditions which help spreading the disease. Many studies have highlighted the role of overcrowding in the causation of scabies.<sup>17–20</sup> The present study has revealed that with the increase in the number of siblings there is a significant increase in the prevalence of scabies. As the number of sibling increases there is increase of overcrowding and so our study results corroborate the findings of other studies.

Social disconnection among girls often creates much mental depression among them as compared to boys. The

**Table 3: Relation of scabies with different socio-demographic characteristics**

Parameters	p-Value	Mean difference	95% Confidence interval	
			Lower	Upper
<i>Scabies</i>				
Age	0.218	2.375	-1.05	5.80
Per capita monthly income	0.003	1200.5	368.26	2032.74
Number of siblings	0.007	-1.93	-3.14	-0.72

**Table 4: Association of scabies prevalence with socio-demographic characteristics and other diseases**

Parameters	Scabies		Total
	Yes	No	
Sex			
Male	50 (48.1%)	54 (51.9%)	104 (100%)
Female	38 (39.6%)	58 (60.4%)	96 (100%)
Chi square=1.46, $p=0.227$ , O.R.=1.41, 95%C.I. of OR=0.78–2.58			
Religion			
Hindu	32 (42.1%)	44 (57.9%)	76 (100%)
Muslim	56 (45.2%)	68 (54.8%)	124 (100%)
Chi square=0.18, $p=0.673$ , O.R.=0.88, 95%C.I. of OR=0.48–1.64			
Mother's literacy			
Illiterate	54 (65.8%)	28 (34.2%)	82 (100%)
Literate	34 (28.8%)	84 (71.2%)	118 (100%)
Chi square=26.94, $p\leq0.001$ , O.R.=4.76, 95%C.I. of OR=2.49–9.16			
Diarrhea in last 15 days			
Yes	32 (65.3%)	17 (34.7%)	49 (100%)
No	56 (37.1%)	95 (62.9%)	151 (100%)
Chi square=11.96, $p\leq0.001$ , O.R.=3.19, 95%C.I. of OR=1.55–6.64			
Amoebiasis			
Yes	74 (61.2%)	47 (38.8%)	121 (100%)
No	14 (17.7%)	65 (82.3%)	79 (100%)
Chi square=36.60, $p\leq0.001$ , O.R.=7.31, 95%C.I. of OR=3.52–15.39			
Giardiasis			
Yes	18 (69.2%)	8 (30.8%)	26 (100%)
No	70 (40.2%)	104 (59.8%)	174 (100%)
Chi square=7.72, $p=0.005$ , O.R.=3.34, 95%C.I. of OR=1.28–8.92			
Boil			
Yes	57 (64.8%)	31 (35.2%)	88 (100%)
No	29 (25.9%)	83 (74.1%)	112 (100%)
Chi square=30.39, $p<0.001$ , O.R.=5.26, 95%C.I. of OR=2.74–10.15			
Ring worm infection			
Yes	48 (63.2%)	28 (36.8%)	76 (100%)
No	40 (32.3%)	84 (67.7%)	124 (100%)
Chi square=18.26, $p<0.001$ , O.R.=3.60, 95%C.I. of OR=1.90–6.87			
Eczema			
Yes	16 (61.5%)	10 (38.5%)	26 (100%)
No	72 (41.4%)	102 (58.6%)	174 (100%)
Chi square=3.73, $p=0.053$ , O.R.=2.27, 95%C.I. of OR=0.91–5.74			
Respiratory tract infection in last 15 days			
Yes	27 (65.9%)	14 (34.1%)	41 (100%)
No	61 (38.4%)	98 (61.6%)	159 (100%)
Chi square=10.00, $p=0.002$ , O.R.=3.10, 95%C.I. of OR=1.43–6.79			



present study has found no significant difference of scabies between boys and girls. Burkhart also has found that the prevalence of scabies is not significantly different between males and females.<sup>21</sup> Mothers' literacy has a significant role in the prevalence of scabies among their children as found in the present study. Fathy et al. in a study from Libya have found that higher education significantly decreases the prevalence of scabies.<sup>22</sup> Scabies is significantly associated with diarrhea, amoebiasis, giardiasis, boil, ringworm infestation and respiratory tract infections. All these diseases are related to poor hygienic conditions. These are closely associated with scabies.

Proper health education regarding hygienic practice can prevent scabies to some extent as evidenced by other studies like study by Talukder et al.<sup>23</sup> Early diagnosis and prompt treatment can only be possible after awareness generation among people. Health workers and school teachers should be trained to deliver health education to the general population and school children. In their review, Hay et al. highlighted the importance of further actions in achieving control targets.<sup>24</sup> Regular research and planned intervention can reduce the burden of scabies from the population.

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# Effectiveness of exercise regime in reducing pain and improving functional stability in lumbar spondylolisthesis patients: A randomized multicentre comparative interventional study<sup>1</sup>

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## ABSTRACT

**Background:** Poor working posture and overuse of back have been implicated in the development of spondylolisthesis. The present comparative study has been carried out to evaluate the effectiveness of specific stabilizing exercise training regime in reducing pain and improving the functional ability in patients with lumbar spondylolisthesis.

**Material and Methods:** This is a multicentre, balanced-randomized, double-blind, parallel-group comparative, randomized control trial. Thirty subjects of either sex, between 40 and 65 years of age having chronic low back pain with radiologic diagnosis of grade 1 spondylolisthesis for more than 3 months duration participated in this study. After screening, using inclusion and exclusion criteria, 30 patients were randomly assigned into Group A ( $n = 15$ ) and Group B ( $n = 15$ ). Both the groups had received Interferential Therapy for 1 week followed by different exercise training programs. Group A received specific stabilizing exercise training of the deep abdominal muscles and Group B back flexion exercise training, both thrice a week for 5 weeks. Back pain and functional disability were recorded by Visual Analogue Scale and Oswestry Disability Index, respectively, both at the beginning and at the end of the treatment period. Changes in the outcome variables were analyzed as improved or unchanged/deteriorated.

**Results:** Clinical and demographic characteristics were similar among both the groups at baseline. Significant difference from baseline was found after a stipulated time between the interventions: specific stabilizing exercise training (Group A) and back flexion exercise training (Group B). Group A more significantly improved after the stipulated time of 6 weeks treatment follow-up. There was significant decrease in pain and disability in Group A than in Group B.

**Conclusion:** The results indicate that specific stabilizing exercise training is more effective in reducing pain as well as in improving function than back flexion exercise training.

**Key words:** Chronic low back pain, Spondylolisthesis, Specific stabilizing exercise training, Back flexion exercise training, Oswestry Disability Index

## INTRODUCTION

Back pain has been cited as the fifth most common reason for which patients visit a physician.<sup>1</sup> Low back pain

is a major health problem among the Western industrialized countries and a major cause of medical expense, absenteeism and disability.<sup>2</sup> Although the cause of low back pain is often multifactorial, many authors have suggested that instability of lumbar vertebral segments can result in pain. Segmental instability of lumbar spine is a potential cause of low back pain and particularly in children and adolescents may be the result of spondylolysis and/or

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spondylolisthesis.<sup>3</sup> Spondylolisthesis is a well-recognized cause of low back pain.

Approximately 2–5% of the general population have spondylolisthesis of which 50% are asymptomatic.<sup>4</sup> Spondylolisthesis in the adult population is associated with radiculopathy, activity related low back pain and neurogenic claudication. About 80% of spondylolisthesis patients have sleep disturbances, back stiffness and worsening of pain when walking and sitting.<sup>5</sup> Spondylolisthesis can be diagnosed using plain radiography, computed tomography (CT) and single-photon emission CT.<sup>6</sup>

Stabilization of the lumbar spine is thought to occur as a result of two mechanisms: antagonistic spinal muscle co-activation and increased intra-abdominal pressure.<sup>7</sup> Panjabi<sup>8,9</sup> redefined spinal instability in terms of a region of laxity around the neutral resting position of a spinal segment called the “neutral zone”. The importance of Lumbar Multifidus (LM) muscle regarding its potential to provide dynamic control to the motion segment in its neutral zone is well acknowledged.<sup>8,10,11</sup> The deep abdominals, in particular the Transversus Abdominis, are primarily involved in the maintenance of intra-abdominal pressure, while imparting tension to the lumbar vertebrae through the thoracolumbar fascia. In spondylolisthesis, translation causes a change in the neutral zone and resultant instability. This instability causes dysfunction and resultant weakness in the lumbar multifidus and transversus abdominis muscles, the two of the local stabilizing muscles in the lumbar spine,<sup>12</sup> which forms a deep and dynamic internal corset enhancing segmental stability of the lumbar spine during functional tasks and the maintenance of neutral spinal postures. This altered biomechanics results in low back pain. It is necessary to switch on the local stabilizing muscles via exercise therapy to decrease the size of the neutral zone and ultimately decrease the symptoms related to instability.

In low grade, i.e. Meyerding Grade 1 spondylolisthesis, conservative treatment which includes physiotherapy is the first treatment of choice.<sup>13–15</sup> It was noted that pain intensity and functional disability in chronic spondylolisthesis patients can be improved by specific stabilizing exercises.<sup>13</sup>

Until this time very limited number of studies have evaluated the benefit of specific training of these muscles in patients with chronic low back pain, where the segmental stability of the lumbar spine has been compromised. This study has been performed to find out the effectiveness of specific stabilizing exercise and back flexion exercise as well as to compare these two exercise regime in reducing pain and improving functional ability to the patient with Grade 1 lumbar spondylolisthesis. This comparison is presented for analyzing and determining the better between the two efforts for establishing an alternative treatment protocol for conservative treatment of spondylolisthesis.

## MATERIAL AND METHODS

This is a multicentre, double-blind, parallel-group comparative, randomized control trial conducted at the Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal and The Vidyasagar Institute of Health, Paschim

Midnapore, West Bengal in Eastern India between January 2008 and December 2011. Patients between 40 and 65 years of age, both the men and women, complaining of recurrent low back pain persisting longer than 3 months with Meyerding Grade 1 spondylolisthesis were selected depending on willingness of the patients to adhere to the treatment. Patients with higher grade of spondylolisthesis, history of spinal injury and spinal surgery, inflammatory joint disease, hip pathology, circulatory disorder, severe osteoporosis, lower limb fracture, psychological disorder and patients with neurological signs and symptoms, e.g. peripheral nerve entrapment, spinal cord compression or other corresponding disorders were excluded from the study. Low back pain persisting more than 3 months has been mentioned as chronic low back pain in this study.

A total of 30 patients among 45 patients with spondylolisthesis were selected based on selection criteria by the first group of independent caregivers. The patients were randomly assigned to Group A ( $n=15$ ) and Group B ( $n=15$ ). The second group of independent caregivers dispensed either of the each exercise group patients according to a computer generated randomisation list. Group A had 7 male patients with 8 female patients and the Group B had 8 male patients and 7 female patients. The exercise program was demonstrated by the third group of independent caregivers while post-treatment assessment was done by the fourth group of independent caregivers. The participants, people demonstrating and following up the exercise program and those assessing the outcomes were blinded to group assignment.

## Null Hypothesis

There is no significant difference between the two groups (Group A and Group B) in the pretreatment Visual Analogue Scale (VAS) score, Oswestry Disability Index (ODI) score, flexion range of motion (ROM) and extension range of motion (ROM). There is no significant difference between specific stabilizing exercise training and back flexion exercise training in VAS score, ODI score, flexion ROM and extension ROM at the end of 6 weeks of treatment.

## Alternative Hypothesis

There is significant difference between the two groups (Group A and Group B). There is significant difference between specific stabilizing exercise training and back flexion exercise training in VAS score, ODI score, flexion ROM and extension ROM at the end of 6 weeks of treatment.

Interferential Therapy (IFT) Unit was used as instrumental tool. The assessed selected variables were pain intensity and functional disability. Assessment was carried out using the assessment proforma, Oswestry Disability Index, Visual Analogue Scale. Assessment was carried out at the pretreatment stage, i.e. on the 1st day before treatment started and post-treatment, i.e. at the end of 6th week. All the measurements were blinded to subjects for the outcome assessment and statistical analyses. The ethical approval was taken from the Ethical Approval Committee of the aforementioned institutions.



Figure 1:

Patients of the both groups first received IFT for the 1st week. The parameter chosen for the treatment were a 4 kHz frequency and a 100 Hz sweep for 15 min duration. The intensity of the IFT was adjusted according to the patient tolerance.

#### Group A: Specific Stabilizing Exercise

After IFT, specific stabilizing exercises were performed for next 5 weeks. Beginners performed the exercises with adequate time to do each and every movement perfectly. In the progression of this new type of exercise, the holding time of the isometric contraction is increased as well as the number of repetitions. The setting exercises can be progressed from low grade with minimal body weight to move functional body positions with gradually increasing external load. Advances need to be made from performing the exercise with a static neutral lumbar spine to other

static positions at more extremes of range. Finally, patients should be able to hold a co-contraction of the deep muscles during dynamic functional movements of the trunk.

1. *Abdominal Drawing-In Maneuver (Figure 1)*: The three recommended body positions to perform the maneuver are—four-point kneeling, sitting and upright positioning. In this maneuver the lower abdomen is drawn up and in or the naval is pulled up towards the spine and contraction is held. The rib cage and pelvis should remain still and the patients continue to breathe normally. Each exercise was performed for 2 sets with 10 repetitions. Each repetition is kept for 10 s with the holding time increasing gradually with a Pressure Biofeedback Monitor using for 3 consecutive days in a week for 5 weeks.
2. *Side Bridge Exercise (Figure 2)*: The side bridge exercise is performed by lying in lateral position. The patient was



Figure 2:



Figure 3:

instructed to start on his/her right side to press up with right arm forming a bridge and to hold there for 10 s. Gradually it was continued to build up a pyramid-like fashion as follows:

- 4 repetitions for 10 s hold (each side)
- 3 repetitions for 10 s hold (each side)
- 2 repetitions for 10 s hold (each side)

- The isometric exercise of Lumbar Multifidus (LM) (Figure 3) was performed in a static lunge position while standing. Patient was instructed to initiate LM contraction by imagining drawing his/her coccyx towards his/her head. It was done for 10 repetitions with 10 s each repetition.

Each of the above exercises was given in 2 sets with 10 repetitions for 3 non-consecutive days in a week for 5 weeks.

### Group B: Back Flexion Exercise

Group B patients received spinal flexion exercises for 5 weeks after receiving IFT initially. The spinal exercises are as follows:

- Single Knee to Chest (Figure 4)*: Double knee to chest exercise was performed with the patient in a supine position with both legs flat on the couch. The patient was instructed to bend one hip and knee up towards his/her chest with grasping the knee with his/her hand and pulling it gently towards chest. The other lower limb is to be kept flat on the couch while doing this exercise. It was repeated with the opposite side. It was advised to do this exercise for 10 repetitions and each repetition was kept for 10 s.
- Double Knee to Chest (Figure 5)*: It was performed with the patient in supine position with both legs flat on the couch. The patient was instructed to bend both the hip and knee towards his/her chest with grasping the knee with his/her hands and pull them towards the chest. Then it was instructed to hold the stretched position for 10 s and to release one knee allowing the leg to return to the couch and then to release the other. This exercise was repeated for 10 times keeping 10 s for each.
- Partial Sit-up (Figure 6)*: It was performed with the patient in supine position with hips and knees flexed, feet supported on the floor and hands resting on the thighs. The patient was instructed to tuck the chin to the chest and slowly sit up until touching the top of the knee. This position was maintained for 10 s. This exercise was repeated for 10 repetitions keeping each for 10 s.
- Abdominal Crunch (Figure 7)*: Abdominal crunch was performed with the patient in supine position with the hips and knees flexed, feet planted unsupported on the



Figure 4:





Figure 5:



Figure 6:

couch and hands held behind the head. The patient was instructed to curl the thorax by contracting abdominal muscles in an isometric fashion until the scapulae were just off the floor. This contraction was maintained for 3 s with 10 repetitions.

5. *Posterior Pelvic Tilt* (Figure 8): It was performed with the patient in a supine position with the hips and knees

flexed, feet planted supported on the floor. The patient was instructed to flatten the small of his/her back against the floor without pushing down the legs. This contraction was maintained for 10 s with 10 repetitions.

Each of the above exercises was done in 2 sets with 10 repetitions for 3 non-consecutive days in a week for 5 weeks.



Figure 7:



Figure 8:

## RESULTS

Tables 1–4 show that since observed  $t$ -value is less than the critical value, the pre-treatment null hypothesis has been accepted, i.e. Group A and Group B were equal in terms of pretreatment VAS score, ODI score, flexion ROM and extension ROM at 1% level of significance ( $p > 0.01$ ). Thus the two groups can be regarded as almost identical.

Since at the post-treatment stage the observed  $t$ -value is greater than the critical value (Tables 1 and 2), we reject the null hypothesis and accept the alternative hypothesis, i.e. treatment applied in Group A is more effective treatment applied in Group B in terms of reducing pain at 1% level of significance ( $p < 0.01$ ). Table 1 represents the comparison

of VAS score between the groups at the end of 6 weeks and appears that the VAS mean value is significantly more in Group B after 6 weeks therapy as the mean value of Group B (2.82) is more than that of Group A (1.68). It can be concluded that Group A therapy was significantly better than group B. Table 2 represents the comparison of ODI score between the groups at the 6 weeks of treatment and appears that the ODI score value is significantly more in Group B after 6 weeks of therapy as the mean value of Group B (30.26) is more than that of Group A (26.96). It can be concluded that Group A therapy was significantly better than Group B.

Since at the post-treatment stage the observed  $t$ -value is less than the critical value (Tables 3 and 4), accept the null

Table 1: Visual Analogue Scale (VAS) Score

Serial no.	Pretreatment VAS Score		Post-treatment VAS Score	
	Group A	Group B	Group A	Group B
1	6.6	6.8	2.2	3.0
2	7.2	3.9	2.3	2.7
3	6.3	5.3	1.4	2.8
4	3.8	7.0	1.3	4.5
5	5.0	3.8	1.6	1.2
6	7.1	5.9	1.5	4.4
7	6.1	4.4	1.6	1.1
8	6.3	5.3	2.0	2.3
9	4.4	5.5	1.7	2.2
10	3.5	6.8	1.9	3.0
11	4.8	7.0	1.0	3.4
12	6.5	5.9	2.2	4.4
13	5.3	5.0	2.0	2.8
14	3.5	3.5	0.9	1.2
15	6.1	6.6	1.6	3.3
	Pre-treatment two sample 't'-test		Post-treatment two sample 't'-test	
Mean	5.50	5.51	1.68	2.82
Standard deviation	1.268858	1.207043	0.424601	1.112398
Observation	15	15	15	15
Degree of freedom	28		28	
t-Value	0.0221152		3.708	
Tabulated value for t statistics at 1% level of significance at degree of freedom=28 is 2.467				



**Table 2: Oswestry Disability Index (ODI) Score**

Serial no.	Pretreatment ODI Score		Post-treatment ODI Score	
	Group A	Group B	Group A	Group B
1	42.00	44.44	31.50	37.77
2	48.89	24.44	38.13	19.55
3	37.87	31.11	30.30	26.44
4	34.00	46.67	26.52	39.20
5	31.11	34.00	23.33	28.90
6	46.67	33.33	36.40	27.66
7	35.56	32.00	27.03	25.60
8	40.00	38.00	31.20	31.16
9	28.89	36.00	21.67	29.52
10	22.22	42.00	16.89	35.28
11	32.50	33.33	25.35	28.33
12	36.00	48.00	28.80	40.80
13	28.50	31.11	21.95	26.44
14	26.67	28.00	20.00	23.52
15	33.33	42.22	25.33	33.78
	Pre-treatment two sample 't'-test		Post-treatment two sample 't'-test	
Mean	34.95	36.31	26.96	30.26
Standard deviation	7.31974	7.00023	5.90743	6.03401
Observation	15	15	15	15
Degree of freedom				28
t-Value	0.520		2.518	
Tabulated value for t statistics at 1% level of significance at degree of freedom=28 is 2.467				

**Table 3: Flexion Range of Motion (ROM) Score**

Serial no.	Pretreatment Flexion ROM Score (expressed in cm)		Post-treatment Extension ROM Score (expressed in cm)	
	Group A	Group B	Group A	Group B
1	15	14	18	16
2	14	17	17	20
3	16	16	18	18
4	19	13	22	17
5	18	19	21	21
6	14	17	18	20
7	16	18	20	20
8	15	17	18	21
9	19	16	23	19
10	20	14	24	16
11	18	12	20	14
12	14	17	18	20
13	17	18	21	21
14	19	20	22	22
15	17	15	20	18
	Pre-treatment two sample 't'-test		Post-treatment two sample 't'-test	
Mean	16.73	16.20	20.00	18.87
Standard deviation	2.051712	2.242448	2.13809	2.29492
Observation	15	15	15	15
Degree of freedom				28
t-Value	0.675		0.1612	
Tabulated value for t statistics at 1% level of significance at degree of freedom=28 is 2.467				

**Table 4: Extension Range of Motion (ROM) Score**

Serial no.	Pretreatment Extension ROM Score (expressed in cm)		Post-treatment Extension ROM Score (expressed in cm)	
	Group A	Group B	Group A	Group B
1	11	10	8	8
2	12	9	9	8
3	10	10	8	9
4	9	8	8	7
5	13	10	10	8
6	10	9	8	7
7	11	13	9	11
8	11	12	8	10
9	10	11	8	9
10	9	10	7	8
11	11	9	9	6
12	12	10	10	7
13	9	11	6	9
14	10	11	7	8
15	11	12	8	10
	Pre-treatment two sample 't'-test		Post-treatment two sample 't'-test	
Mean	10.60	10.33	8.20	8.33
Standard deviation	1.183216	1.345185	1.08233	1.34519
Observation	15	15	15	15
Degree of freedom		28		
t-Value	0.583		0.293	

Tabulated value for *t* statistics at 1% level of significance at degree of freedom=28 is 2.467

hypothesis was accepted, i.e. treatment applied in Group A is more or less the same as Group B in terms of reducing pain at 1% level of significance ( $p < 0.01$ ).

## DISCUSSION

The result of this comparative study demonstrated that there was more statistical improvement with Group A treatment than Group B treatment in patients with chronic low back pain with radiologic diagnosis of lumbar spondylolisthesis. Both the interventions resulted in reduced pain and improved function with chronically symptomatic spondylolisthesis in short-term follow-up.

The present study findings support the Panjabi's hypothesis that the stability of the lumbar spine is dependent not solely on the basic morphology of the spine but also on the correct functioning of the neuromuscular system.<sup>9</sup>

The strength of this study are the standardized measured procedure, the use of reliable and valid outcome measures, the measurements were blinded to both groups for the outcome assessment and statistical analyses, the attempt to follow a treatment guideline and the good compliance in the interventions.

In view of some limitations of this study the suggested consideration for further studies are as follows:

1. The duration and sample size can be increased.
2. Pressure biofeedback can be used to measure abdominal pressure.

3. Electromyography could not be used due to inherent ethical limitations, which can be used.
4. Insistence on a fixed follow up program for each and every patient even after the completion of sessions to assess the longevity of the improvement.

## CONCLUSIONS

Lumbar spinal instability from spondylolisthesis is related to an increase in the size of the neutral zone which results in pain and dysfunction. The result of this study concluded that specific stabilizing exercises have effectively reduced low back pain and improved function after a 6 weeks intervention in patients with chronic low back pain with radiologic diagnosis of Grade 1 lumbar spondylolisthesis. However, both interventions appear to have a positive effect in pain reduction and function. As the differences for all outcome measures were greater for specific stabilizing exercise group, hence seem to be a favorable treatment option for patients with chronic low back pain with radiologic diagnosis of spondylolisthesis.

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## Mission Indradhanush—Bridging the immunization gaps or an Utopia?

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Dear Sir,

With the emergence of 3rd phase of Mission Indradhanush (MI)—a pan India endeavor, which aims at 90% full immunization coverage, the question arises that are we really being paid for the huge resources that are at stake because of the humongous expenses that Government of India (GoI) suffers? Is it not the same English proverb which runs down the memory lane saying, “Old wine in a new bottle?” Is it not the same Special Immunization week that we used to have couple of years back?

Knowing that we achieved extremely less improvement of FIC coverage, i.e., 1%/year from 2009 to 2013 and every third child missed their scheduled immunization dose,<sup>1</sup> are we really strengthening our Routine Immunization System or are we just carrying out a Number Game to impress the Government that boasts in the parliament stating the huge number of children and pregnant women being vaccinated under this endeavor?

Do we really do justice to the huge financial commitment made by the donor agencies that supply the expensive vaccines to a country like India having a birth cohort of 25.7 million? Rotavirus (RV) has an annual disease toll of approximately 85,000 and the vaccine efficacy is around 51% in the developing nation, whereas measles and rubella (MR) vaccine quite easily surpasses it; moreover, even though we have a very effective vaccine, i.e., the MR vaccine, still the rotavirus vaccine (RVV) is promoted ahead of it.<sup>2</sup> Are we at a platform from where we can steer our own future to a newer and safer India?

Does the prioritization of districts executed in Mission Indradhanush fulfill what we are aiming at? Are these 216 MI districts chosen in 3rd phase those which really need it?

The selection process is totally biased since it is focused on concurrent monitoring findings of WHO NPSP, which has many interdistrict, interunit variations.

Have we done enough to incorporate the gains made in the 1st and 2nd phases? Are the children who needed the most attention being served by this optimistic endeavor?

The answers to all these above questions are still not clear to me as well as many common people. I conclude by saying, Lord Please protect the needy kids of our Mother India. Amen!

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## Arsenicosis and malnutrition

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Arsenic exposure through drinking water is a major health problem affecting many countries in the World, viz., Bangladesh, India, Argentina, Mongolia, China, Chili, Thailand, Taiwan, Mexico, and some parts of USA.<sup>1-4</sup> Prolonged exposure of arsenic of 5–90 µg/kg body weight/day results in arsenicosis,<sup>5</sup> characterized by hyper- and hypopigmentation, keratosis, various systemic manifestations like weakness, anemia, chronic lung disease, peripheral neuropathy, liver fibrosis, gangrene of limbs, and cancers of skin, lungs and urinary bladder.<sup>6-8</sup> Studies on populations of Taiwan, India, and Argentina exposed to arsenic through drinking water have suggested that malnutrition increases the risk of arsenic-induced diseases.<sup>9-13</sup> Several human studies have identified associations between malnutrition and arsenic-induced skin lesions, skin cancer, and cardiovascular effects.<sup>12,14,15</sup> Literature surveys indicate arsenic resistance and its relation with nutritional status.<sup>16-19</sup> Laboratory experiments have demonstrated that specific micronutrients can modify arsenic metabolism and toxicity.<sup>13</sup> Inhabitants of Taiwan and the Antofagasta region in northern Chile with severe health effects due to ingestion of high arsenic contaminated drinking water were reported to have a poor nutritional status.<sup>20</sup>

Inorganic arsenic is metabolized to monomethylarsonic acid (MMA) and dimethylarsinic acid (DMA), and this methylation facilitates urinary arsenic excretion, which is dependent on availability of S-adenosylmethionine (SAM). The methyl group from SAM may be derived from dietary components such as methionine, choline, folate, and other nutrients.<sup>21,22</sup> Dietary protein, iron, zinc, and niacin are associated with urinary excretion of MMA and DMA.<sup>23</sup> Previous studies suggest that persons with more complete methylation have a lower risk of adverse arsenic-related health outcomes.<sup>24</sup> Diet poor in methionine in protein is likely to decrease the ability to methylate arsenic and increase the arsenic toxicity.<sup>25</sup> Folate and cobalamin (vitamin B12) have been suggested to play an important role in the detoxification of ingested arsenic.<sup>26</sup> Studies carried out in experimental animals have shown that severe protein deficiencies can impair arsenic methylation and excretion.<sup>22</sup> Vitamin C reduces the toxicity of arsenic.<sup>27</sup>

Intake of carbohydrate, protein, animal protein, fat, vitamins, and minerals was estimated from a diet survey by 24-hour recall method in arsenic exposed study population of south 24 parganas and it was found in that study that

deficiencies of some nutrients like animal protein, calcium, fiber, folate, and vitamin C may increase the risk of arsenic-induced skin lesions.<sup>28</sup> Some researchers have postulated that deficiencies in some nutrients such as beta-carotene, methionine, and zinc may increase susceptibility to arsenic-induced health effects.<sup>13</sup> Experimental animals with a low dietary intake of methionine, choline, and protein were found to have lowered methylation of inorganic arsenic.<sup>22</sup>

Nutrition surveys in eight states of India conducted by the National Nutrition Bureau of India revealed calorie consumption less than the RDA of energy (male—2875 and female—2225 kcal/day).<sup>29</sup> Studies in Murshidabad district of West Bengal revealed that in more than 50% of the household surveyed families with poor nutrition suffer more from arsenic toxicity.<sup>27</sup> Other studies also revealed that undernourishment was found to increase the risk of skin lesions and skin cancer in arsenic-exposed populations.<sup>9,11,15</sup> In Western States like Alaska, studies revealed that populations consuming high concentrations of arsenic from their drinking water often did not show arsenical skin lesions. The reason may be their nutritional status.<sup>30</sup> Experimental research in animals has also found that low protein and amino acids in diets increase risks of arsenic related health effects.<sup>12,22,31</sup> The study conducted among residents of California where arsenic level in the drinking water supplies had been near 100 µg/l suggests that low intakes of dietary protein, iron, zinc and niacin lead to decreased production of DMA and increased level of MMA in arsenic exposed individuals.<sup>32</sup> Studies showed that consumption of high levels of niacin (vitamin B3) was associated with arsenic methylation.<sup>33</sup> There are studies indicating that consumption of a diet rich in riboflavin, pyridoxin, vitamin A, C, and E can significantly reduce the harmful effects of developments of skin lesions.<sup>26</sup> Other nutrients like niacin, iron, calcium, protein, and thiamin were also reported to be protective against arsenic toxicity.<sup>34</sup> Inadequate intake of folate, methionine, cysteine, vitamin B6 and B12, calories and proteins are associated with arsenic related health effects in humans.<sup>12,22,34-36</sup> It was experimentally proved that low zinc concentrations were found in blood and urine of arsenic effected patients.<sup>37</sup>

A cross-sectional study was conducted in Chakdah and Haringhata block of Nadia district of West Bengal to determine the dietary intake of nutrients and its correlation with manifestations of arsenicosis.



The study revealed that low socioeconomic status along with less dietary intake of calorie, protein and micronutrients may have a definite role in increasing the risk of development arsenicosis. It was found that there was significant difference in intake of protein along with micronutrients like thiamine, riboflavin, niacin, zinc, and choline in the diet of cases compared to exposed controls in both the sexes, indicating the probable role of above nutrients in development of diseases.<sup>38</sup>

Based on the above findings all patients living in arsenic endemic area should be advised to consume a variety of green leafy vegetables, locally available pulses and fruits rich in antioxidant and other micronutrients along with low-cost animal protein like egg, fish to decrease the susceptibility from arsenic-related health effects.

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## Gigantomastia of pregnancy

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### ABSTRACT

A case of Gigantomastia during pregnancy in a 19-year-old female, gravida 1, following a full term gestation, with a total breast weight of 4.6 kg, complicated by infection and ulcerations was presented. Thorough laboratory analyses did not reveal any hint on the cause of this enormous breast enlargement. Gynecological examinations and ultrasound had revealed a viable, progressive normal fetus. The severity of the problem was further emphasized by the patients' complain of severe pain and strain in her social relations. Unilateral reduction mammoplasty was performed to prevent further complications. The procedure was completed without any complications or large amount of blood loss. Less than 100 cases of gravid gigantomastia have been reported. Etiology remains uncertain, and controversy exists in therapeutic modality. According to the literature the most reliable conservative treatment is bromocriptine therapy, but if the condition progresses surgical intervention, in the form of reduction mammoplasty or simple mastectomy, is the treatment of choice.

**Key words:** Pregnancy, Gigantomastia, Reduction mammoplasty

## INTRODUCTION

Hypertrophy of the breast (macromastia and gigantomastia) is a rare medical condition of the breast connective tissues. The indication is a breast weight that exceeds approximately 3% of the total body weight.<sup>1</sup> There are varying definitions of what is considered to be excessive breast tissue, that is the expected breast tissue plus extraordinary breast tissue, ranging from as little as 0.6 kg (1.3 lb) up to 2.5 kg (5.5 lb) with most physicians defining macromastia as excessive tissue of over 1.5 kg (3.3 lb). Some resources distinguish between macromastia, where excessive tissue is less than 2.5 kg, and gigantomastia, where excessive tissue is more than 2.5 kg.<sup>2</sup> The enlargement can cause muscular discomfort and over-stretching of the skin envelope, which can lead in some cases to ulceration.<sup>3</sup> Hypertrophy of the breast tissues might be caused by increased histologic sensitivity to the female hormones prolactin, estrogen, and progesterone; or an abnormally elevated hormone(s) level in the blood, or both.<sup>4</sup> Breast hypertrophy is a benign progressive enlargement, which can occur in both breasts (bilateral) or only in one breast (unilateral).

## CASE HISTORY

A 19-year-old female patient had presented to us with complaint of swelling in the left breast for past 1 year and

pain for past 4 months. Swelling was insidious on onset, progressively increased in size, with history of rapid increase in size. Pain was dull, aching in nature, localized to left breast. She was gravida 1 with no other conception in the past. She delivered a full term baby with the entire length of gestation being otherwise unremarkable. Left breast engorgement started developing after 4 weeks of pregnancy. The engorgement had rapidly increased in the third trimester of pregnancy and continued postpartum. After 1 month of a normal delivery she had presented with fever, pain in left breast and milky discharge from nipple. She was treated conservatively with antibiotics and with analgesics and was discharged with advice to take bromocriptine. Her swelling had continued to progress to the present state. There was no history of any co-morbidity. No other significant medical or surgical history.

On examination breast was diffusely enlarged, with no active discharge, healed ulcerative changes in upper inner quadrant of breast, no definite lump palpable, non-tender breast with normal temperature, weight around 4.6 kg and systemic examination was within normal limits (Figure 1).

A reduction mammoplasty was planned in association with the Department of Plastic Surgery. Preoperatively skin markings were made. Routine hematological investigations were within normal limits. USG of breast showed lump



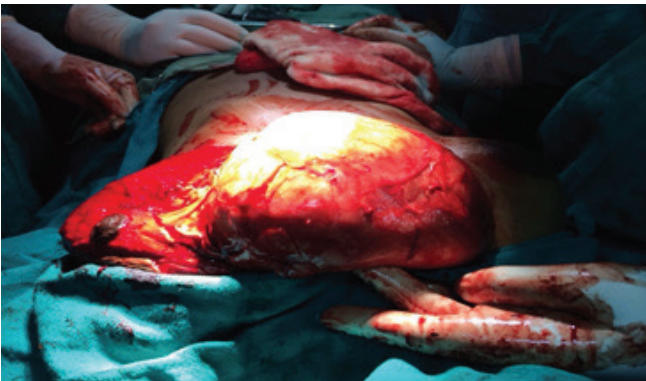


**Figure 1:** Left breast preoperatively



**Figure 4:** Specimen

in left breast with no sizeable collection. FNAC-milk was aspirated admixed with epithelial cells. A reduction mammoplasty was then performed. Post-operatively she developed mild seroma at the site of intervention which was gently drained with dressing. Her post-operative recovery was otherwise unremarkable. Specimen sent for histopathological examination showed infiltration of inflammatory cells with extensive areas of infarction. No epithelioid cells or malignant change present (Figures 2–7).



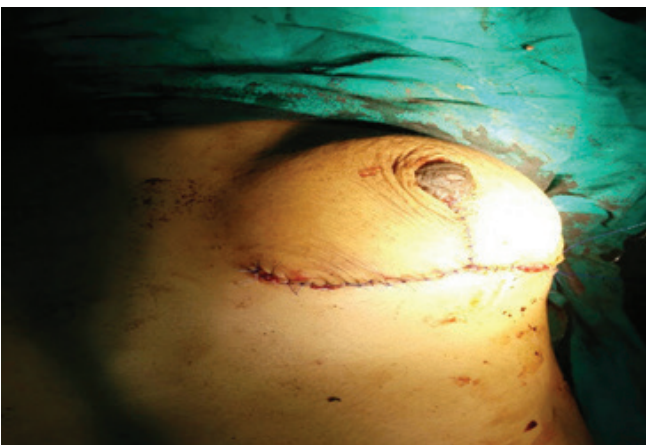
**Figure 2:** Intra-operatively



**Figure 5:** Post-operatively—day 3



**Figure 6:** Post-operatively—day 6



**Figure 3:** Immediate post-operatively



**Figure 7:** Post-operatively—day 14

## CONCLUSION

This fortunately rare condition is particularly important in developing countries as it prevents breast feeding, which is crucial for the development of the infant, and prevents effective contact between mother and baby, thus making bonding difficult. Also in country like ours patients suffering from this disease have poor social acceptance. Prolonged follow-up may not be desirable for a minority of these patients. Awareness of this seemingly benign condition would lead to a better quality of life for those few patients suffering from this disease.<sup>5</sup>

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## A rare case of recurrent subluxation of elbow managed by ligament reconstruction

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### ABSTRACT

Injury of elbow occurs mainly because of fall on outstretched hand with elbow slightly flexed and a valgus internal rotation force acting on the elbow. In these mechanisms lateral collateral ligament (LCL) is affected first and medial collateral ligament (MCL) is last to be affected resulting in gross instability. A 20-year-old man presented to us with instability of elbow for 1 year. After clinical examination and MRI, it was concluded that MCL injury of elbow joint was present. MCL reconstruction was performed using SemiT&Gracilis graft. There was satisfactory outcome at 1 year follow-up with return to pre-injury functional status. MCL injury of elbow is a rare injury. Reconstruction of MCL can bring satisfactory functional outcome.

**Key words:** Subluxation, Ligament reconstruction, Graft fixation

### BACKGROUND

Elbow dislocations are relatively rare in adolescence. According to O'Driscoll et al. a valgus axial posterolateral force acts over the elbow which causes first lateral collateral ligament (LCL) avulsion then the force travel along the capsule and anterior bundle of medial collateral ligament (MCL) is affected last. It is the main valgus stabilizer of elbow<sup>1</sup> and it originates from antero-inferior tubercle of medial humeral epicondyle and inserts on sublime tubercle of ulna.<sup>2</sup> Injury of MCL causes valgus instability and recurrent elbow dislocation/subluxation.<sup>1,3,4</sup>

### CASE PRESENTATION

A 20-year-old boy presented to our institute with h/o injury over dominant elbow due to fall while playing football a year back. Swelling and pain appeared over elbow and he could not move his elbow. He was taken to nearby hospital and elbow dislocation was diagnosed. Initially elbow reduction was done and slab immobilization was applied for 3 weeks. Elbow dislocated again while throwing a ball after 2 months, it was reduced by the local doctor and immobilization was done. Elbow dislocated 3 times in a year and it was hampering his daily activities. Valgus stress test and valgus extension overload test were positive. There

was apprehension with pivot shift manoeuvre. The Mayo elbow performance score was fair with 65 points. AP view of elbow shows normal bony structure.

On MRI, it was concluded that MCL tear of elbow joint was responsible (Figure 1).

### PLANNING

MCL exploration and if required, reconstruction was planned using SemiT&Gracilis autograft.

### Surgical Steps

- **Graft:** Ipsilateral semitendinosus and gracilis autograft harvested and prepared by tensioning and stitching according to the required length.
- **Exposer:** Proximal ulna and medial condyl exposed through medial flexor-pronator split approach.
- **Tunnel:** According to the diameter of the prepared graft, two bicortical tunnels created, one near sublime tubercle of ulna (Figure 2) and the other in medial epicondyle of humerus.
- **Graft Fixation to ulna:** Graft fixed to the ulnar tunnel by one bio-screw.





Figure 1:

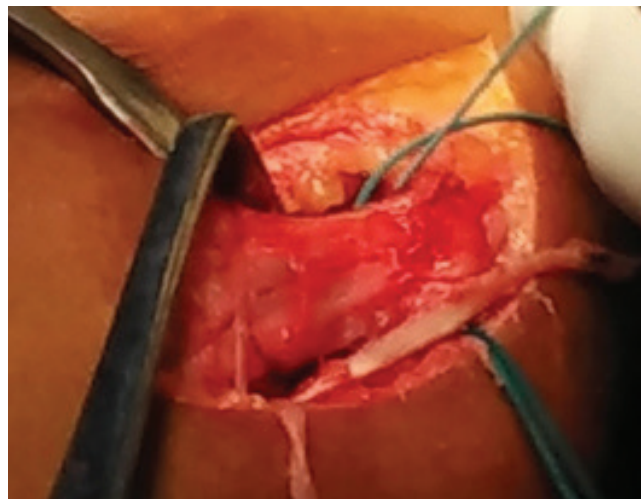


Figure 3:



Figure 2:

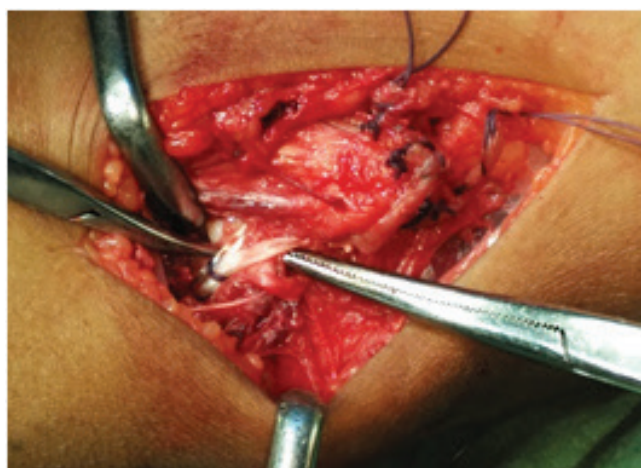


Figure 4:

- **Graft passage:** The two openends of the graft are passed underneath the flexor-pronator, one end in front of epicondyle and other behind epicondyle. Tehn passed through thee picondylar tunnel crossing each other inside tunnel (Figure 3).
- **Graft fixation to medial epicondyle:** Varus stress given, tension applied, fixed with another bio-screw in the epicondylar tunnel. Two ends are again stitched to each other and surrounding soft tissue outside the tunnel over the superior aspect of the epicondyle (Figure 4).
- **Closer:** Valgus stress resulted in no instability. Wound closed in layers.

## POST-OPERATION AND FOLLOW-UP

Plaster back slab was applied and followed up after 10 days by a removable hinged elbow splint. Intermittent active elbow mobilization was given keeping the splint. Splint was discarded after 6 weeks and muscle strengthening exercise started, but valgus stress was avoided. Normal

daily activities started after 4 months. At 6 months, Mayo score returned to 100. After a year of follow-up, there was no recurrence and complete return to the pre-injury status.

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