Degenerative Changes in Lumbar Region Always Lead to Bilateral Degenerative Changes in Knee-Joints and Vice-Versa: Sensation of Pain Cannot Only be The Parameter of Degeneration

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Abstract

The perception of pain through gait control theory was promulgated five decade ago. It involves a process of inhibitory pain modulator at the spinal cord level. The present paper aims with detailed observations, involving a large number of patients, that knee joint pain may not be felt when there are degenerative changes in the lumbar region due to disc compression. But disc compression at lumbar region always leads to degenerative changes in the knees, whether pain is felt or not. Similarly knee joint pain with degenerative tissue damage is always associated with disc compression at lumbar region, whether pain is felt or not. This phenomenon is obvious in large number of patients irrespective of sex, age, bodyweight, lifestyle and ethnic barriers, examined with either pain in knee joints or in lumbar region. This research is supported by anatomical measurements, radiological and biochemical reports. This present study revels for the first time a new method of anatomical measurements with supportive clinical observations.

Keywords: Knee joint pain; Disc compression; Back pain

Introduction

Knee joint pain may arise from a disc protrusion in the back. The nerves that transmit the sensation of pain to the legs and feet are located in lower back region. With ageing, discs between the vertebrae bulge out and compressed the nerves, sending pain signals. The locator of pain depends on which disc is protruded. The nerves that send fibres to both the knees are located at the second, third and fourth lumbar vertebral levels in the lower back area. During investigation of patients, we found that if a disc is compressing the nerves on the above locators, the pain is always felt in the knee region. Similarly, we observed in patients that if the pain is in the knee region then there is always degenerative tissue damage in the knee region. In almost all cases compression in the above lumbar vertebral levels take place, even though patients may not feel any pain in the affected regions.

Nociceptors are specialised secondary receptors responsible for detection of noxious stimuli, transforming the stimuli into electrical signals which are conducted to the central nervous system. They are the free nerve endings of primary afferent Aδ and C fibres inflammatory mediators (prostaglandin, cytokines etc.) are released from damaged tissues and can stimulate nociceptors directly. The experience of pain is complex and subjective. The somato sensory cortex is important for localisation of pain. Functional magnetic resonance imaging demonstrated that a posterior segment of the hypothalamus is activated during acute pain experience. The commonest areas, which are activated include the primary and secondary somato sensory (S1 and S2), insular anterior cingulate cortex and prefrontal cortex and thalamus. These areas are all important for pain perception [1-7].

In this presentation, we are reporting the fact that if there are degenerative changes (compression) in the lumbar vertebrae levels, in most cases, in patients we examined, it leads to degenerative changes in the knee joints though pain may not be felt at the knee joint immediately. Similarly in patients examined with knee joint problems and pain may not be felt immediately in the back region, though in most cases, the patients have disc compression in the lumbar vertebrae level. This is true irrespective of their sex, age, body weight, lifestyle and ethnic criteria. Pain only in any particular region in lumbar or knee joints may not always be a parameter to indicate degenerative changes of these areas. The present aim of the study is proved with anatomical measurements, radiological and biochemical reports. The anatomical measurements as have been presented here are author’s own method of measurements with supportive evidences of radiological parameters and biochemical analysis reports.

Materials and Methods

Five hundred forty eight patients from OPTM Health care were enrolled into this study. This study was approved by the Institutional Ethics Committee and all participants signed an informed consent form for physical examinations, blood samples collection and X-ray reports.

Exclusion criteria

Out of 548 patients, 63 patients (37 males and 26 females) were excluded for the following reasons:

1) Patients with cuts, wounds, or any type of chronic skin disease (eczema, psoriasis etc.) on the back, in legs, pelvic area, inguinal (groin area) and other regions (10 males and 7 females), 2) with parallel multiple drug dependence (4 males and 5 females), 3) with surgical implants (8 males and 5 females), 4) with pacemaker (7 males and 2 females), 5) with history of cancer (3 males and 4 females) and 6) with history of severe neurological diseases (5 males and 3 females).

Patients selection

The balance of patients (485) after exclusion were physically...
examined and observations were noted in order to analyze and justify the condition of knee and ankle joints, thighs, back and calf muscles structure.

For the purpose of this study, all patients were examined and analyzed for the following:

- Measurements of knee gaps between the short head of biceps femoris and the surface of the bed (Figure 1)
- Diameter of group of calf muscles (Figure 2)
- Diameter of group of thigh muscles (Figure 3)
- Diameter of group of muscles connected with knee joints, 4cm above the patella (Figure 4)
- Diameter of group of muscles connected with knee joints, 4cm below the patella (Figure 5)
- The bilateral angles of flexion in supine, prone and standing positions (Figures 6-8)
- Bilateral angles of extension in supine, prone and standing positions (Figures 9-11).

These data were analyzed to examine the current quantum of damage in the muscles of both the legs and back region. Radiological pictures of both the knee joints and lumbo sacral spine were also noted at that time (Figures 12-23). Biochemical parameters such as C-reactive protein (CRP), muscle creatine phosphokinase (CPK) and aldolase were measured in order to justify the degenerative changes in the muscle structure [12-14].

Control group

Ninety patients including 36 males and 54 females in the age group (40-80) years were treated in our clinic 6-12 months back, were taken as control group.

Final selection

Out of 548 patients, after exclusion of 63 patients and control group of 90 patients, the balance 395 patients (145 males and 250 females) were subdivided into different age groups between 40 and 50, 51 and 60, 61 and 70 and 71 and above 80 years as follows:

- Age group of (40-50) years:
  total patients 51 (13%) – male: 20 (39%) and female: 31 (61%)
Figure 7: Showing the method of measuring the knee flexion of right and left knee joints lying in prone position with the help of Goniometer.

Figure 8: Showing the method of measuring the knee flexion of right and left knee joints in standing position with the help of Goniometer.

Figure 9: Showing the method of measuring the knee extension of right and left knee joints lying in supine position with the help of Goniometer.

Figure 10: Showing the method of measuring the knee extension of right and left knee joints lying in prone position with the help of Goniometer.

Figure 11: Showing the method of measuring the knee extension of right and left knee joints in standing position with the help of Goniometer.

Figure 12: Represents there is a degenerative changes in knee joints as well as lumbar region but the patient complains massive pain in the left knee joint and slight pain in lumbar region and there is no sensation of pain in the right knee as reported.

Patient No: 1, Age: 45 yrs, Sex: F

Show advanced bilateral degenerative osteoarthroses -- relatively more markedly in the lateral tibio-femoral compartments.

Show fairly advanced degenerative lumbar spondylosis -- particularly at L-L, L-L & L-S levels -- along with relatively exaggerated normal lordosis of lumbar spines, as well as scoliosis -- having its convexity towards right side. No bony pathology is shown in the sacro-iliac articulation on either side.

Figure 13: Represents there is a degenerative changes in the knee joints as well as lumbar region but the patient complains massive pain in the left knee joint and moderate pain in the right knee joint but there is slight sensation of pain in the limber region as reported.

Patient No: 2, Age: 50 yrs, Sex: M

Show demineralisation of the bones around both knee joints, with advanced back-ground degenerative osteo-arthroses on both sides -- particularly in the medial compartments -- along with genu varum on the right side as well.

Show narrowing of the inter vertebral space between L-L, along with linear sclerosis of the opposing end-plates of their bodies, and osteophytic lipping -- suggestive of disc lesion.

Figure 14: Represents there is a degenerative changes in both the knee joints as well as lumbar region but the patient complains massive pain in the right knee joint only and there is no sensation of pain neither in left knee joint nor in the lumbar region as reported.

A.P. views show early osteo-arthrosis in both knee joints -- relatively more markedly on the right side & particularly in the lateral tibio-femoral compartments.

Show grade II spondylolisthesis of L vertebra on L, with advanced secondary degenerative disc changes between them. Break, with a gap in the pars inter-articulares of L vertebra is also evident. Early back-ground degenerative spondylosis -- particularly at D-L & L-L levels -- also is shown. Mild scoliosis of lumbar spines, with convexity towards left side, is evident. No bony pathology is shown in the sacro-iliac articulation on either side.
Lateral views show senile demineralisation of the bones around both knee joints, with back-ground osteo-arthritis on both sides – particularly in the medial compartments along with genu varum on the right side as well.

Figure 15: Represents there is a degenerative changes on both the knee joints as well as lumbar region but the patient complains massive pain in the lumbar region and moderate pain in the right knee joint but there is no sensation of pain in the left knee joint as reported.

Patient No: 5, Age: 60 yrs, Sex: F

A.P. views show senile demineralisation of the bones around both knee joints, with advance back – ground degenerative osteo-arthritis on both sides – particularly in the medial compartments along with genu varum on the left side as well.

Figure 16: Represents there is a degenerative changes in both the knee joints as well as lumbar region but the patient complains massive pain in the lumbar region and moderate pain in the right and left knee as reported.

Patient No: 7, Age: 63 yrs, Sex: M

A.P. views show senile demineralisation of the lumbar vertebrae, as well as the bones forming pelvis, with back-ground degenerative lumbar spondylolisthesis – more markedly at L1-L2 & L5-S1 levels. No bony pathology is shown in the sacro-iliac articulation on either side.

Figure 18: Represents there is a degenerative changes in both the knee joints as well as lumbar region but the patient complains massive pain in the lumbar region and moderate pain in the left knee joint but there is no sensation of pain in the right knee joint as reported.

Patient No: 8, Age: 64 yrs, Sex: M

A.P. & Lateral views show senile demineralisation of the lumbo-sacral vertebra, with back-ground degenerative lumbar spondylolisthesis – particularly at L1 - L2, & L5 - S1 levels – along with relatively exaggerated normal lordosis of lumbar spines. No bony pathology is shown in the sacro-iliac articulation on either side.

Figure 19: Represents there is a degenerative changes in both knee joints as well as lumbar region but the patient complains massive pain in the left knee joint and there is no sensation of pain in the right knee joint and in the lumbar region as reported.

Patient No: 9, Age: 68 yrs, Sex: F

A.P. views show mild degree of demineralisation of the bones around both knee joints, with back-ground degenerative osteo-arthritis on both sides – particularly in the medial tibio-femoral compartments – and bilateral genu varum as well.

Figure 17: Represents there is a degenerative changes in both the knee joints as well as lumbar region but the patient complains massive pain in the right knee joint and very much pain in left knee joint and there is no sensation of pain in the lumbar region as reported.

Patient No: 9, Age: 68 yrs, Sex: F

A.P. & Lateral views show early degenerative lumbar spondylolisthesis – particularly at L1-L2 & L5-L6 levels along with diminution of normal lordosis of lumbar spines. No bony pathology is shown in the sacro-iliac articulation on either side.

Figure 20: Represents there is a degenerative changes in both the knee joints as well as lumbar region but the patient complains massive pain in the right knee joint and moderate pain in left knee joint and there is no sensation of pain in lumbar region as reported.
Age group of (51-60) years:
- total patients 150 (38%)—male: 40 (27%) and female: 110 (73%)
- Age group of (61-70) years:
- total patients 139 (35%)—male: 40 (29%) and female: 99 (71%)
- Age group of 71->80 years:
- total patients 55 (14%)—male: 45(82%) and female: 10 (18%)

Sensation of pain reporting scale

During the course of examination of patients, the author has noticed that the patients were instantly reporting pain as extremely painful (which the author termed as ‘A’ in the present study of sensation of pain reporting scale) or very painful (which the author termed as ‘B’) in the areas where the intensity of the pain was much higher among the three joints such as right knee joint, left knee joint and lumbar region.

After further queries the patients reported the less pain sensation areas among the three joint areas as 'moderately painful' (which the author termed as ‘C’) or 'slightly painful' (which the author termed as ‘D’) or 'no pain' (which the author termed as ‘E’) in the present study of sensation of pain reporting scale. Usually, on the basis of above mentioned pain sensation reporting, X-rays of particular regions, (either in right knee joint or left knee joint or both or LS spine region) were taken to confirm the patients' statements of sensitivity of pain and determine whether any degenerative changes or any other condition to trigger pain have occurred.

For the purpose of quantifying the sensation of pain reporting in right knee joint, left knee joint and lumbar region, the author has established a simple sensation of pain reporting scale as, ‘A’ which implies extremely painful, ‘B’ which implies very painful, ‘C’ which implies moderately painful and ‘D’ which implies slightly painful and ‘E’ which implies no pain. Normally patients suffering extremely painful and very painful conditions reported to the clinic for check-ups and treatment thereon. For the purpose of the study, the sensation of pain reporting scale for 395 patients of different age group of (40-50), (51-60), (61-70) and (71->80) years excluding the patients in the control group given in Table 1A.

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC Index)

90 patients (36 males and 54 females) were taken in control group out of 485 patients and rest 395 patients in different age groups of 40-50, 51-60, 61-70 and 71->80 years were calculated separately for all males and females for all the parameters in percentage as shown in the WOMAC Index. The mean and standard deviation values are given in Table 2F.

Statistical analysis

Statistical analysis was done by using software (Graph Pad Prism, Version, 5.0) for student-t test to determine significant values at P<0.05 level along with R (Pearson correlation coefficient) values to determine strong and weak correlation among two variables for measuring different parameters of osteoarthritic patients' for age group of 40 – 50, 51 – 60, 61 – 70 and 71->80 years separately for right and left legs compared to control group (40->80) of subjects. The comparisons were made for males and females separately in case of individual groups. All the data were considered and expressed at statistically significant (P<0.05) level.

First and foremost, the author has tried to evaluate the pain intensity
Table 1A: The sensation of pain reporting scale of 395 patients having degenerative changes on knee joints and lumbar regions of age groups (40-50) years, (51-60) years, (61-70) years and (71->80) years irrespective of sex, body weight, lifestyle and ethnic barriers.
with the visual analogue scale (VAS) (15), but the main deterrent, the author found, was in putting the dot at the right places on 100 mm long line, which represented the pain intensity in communicating the intensity of pain on the right knee joint, left knee joint and lumbar region, by articulating extremely painful (A) or very painful (B) or moderately painful (C) or slightly painful (D) or no pain (E) was more precise. The new sensation of pain reporting scale has established as a sure method of assessing the intensity of pain in this study (Table 1A).

Age groups wise percentage analysis of pain scale for males and females patients as per Table 1B as follows:

Age group of 40-50 years:
- Females were reporting to the clinic for treatment of pain more than the male patients by 22%.
- Equal percentage of male and female patients were reporting for right knee joint pain.
- 11% more female patients were reporting for left knee joint pain than male patients.
- 11% more female patients were reporting for pain in lumbar region than male patients.

Age group of 51-60 years:
- Females were reporting to the clinic for treatment of pain more than the male patients by 46%.
- 8% more female patients were reporting for right knee joint pain than male patients.
- 17% more female patients were reporting for left knee joint pain than male patients.
- 21% more female patients were reporting for pain in lumbar region than male patients.

Age group of 61-70 years:
- Females were reporting to the clinic for treatment of pain more than the male patients by 42%.
- 7% more female patients were reporting for right knee joint pain than male patients.
- 14% more female patients were reporting for left knee joint pain than male patients.
- 21% more female patients were reporting for pain in lumbar region than male patients.

Age group of 71->80 years:
- Males were reporting to the clinic for treatment of pain more than the female patients by 64%.
- 9% more male patients were reporting for right knee joint pain than female patients.
- 18% more male patients were reporting for left knee joint pain than female patients.
- 37% more male patients were reporting for pain in lumbar region than female patients.

It was noticed from the Table 1B, that the subjects were more susceptible to pain in left knee joint than right knee joint. In case of degenerative changes in the lumbar region, it was observed that the age groups of 40-50 years were more affected (73%) with compared to other age groups. It was also observed the age groups of 71->80 years in the male were more affected than the other groups of 51-60 and 61-70 years.

In Tables 2A–2E, average values of various measurement parameters viz. knee gaps between the short head of biceps femoris and the surface of the bed (in cm), diameter of calf muscles (in cm), diameter of thigh muscles (in cm), diameter of group of muscles connected with the knee joints, 4 cm above the patella (in cm), diameter of group of muscles connected with the knee joints, 4 cm below the patella (in cm) of 485 subjects were observed through these suitable techniques to identify osteoarthritis in different age groups of patients’ (40 – 50, 51 – 60, 61 – 70 and 71 and above), when compared to control groups of subjects of age groups (40 - >80) for right and left legs. The comparisons were made on males and females groups of patients’ versus control groups.

Measurements of knee gaps between the short head of biceps femoris and the surface of the bed for both the knee joints were differed as given in Table 2A. The reasons for not touching the back of the knee joints on the bed was due to the cumulative effects of muscular wasting of vastus lateralis, vastus medialis, iliobial tract, Inflammation of popliteal regions, stiffness of rectus femoris, inflammation over the connective joint muscles such as sartorius, gracilis, semimembranosus, semitendinosus on the medial part of knee joint and rigidity (calcification) of the movement of the patella etc. This happens due to prolonged use of knee supports, hyaluronic acid injections or corticosteroidal injections or arthrocentesis (joint fluid aspiration) used for quick diminishing of pain and inflammation and such other reasons.

In case of knee gaps between the short head of biceps femoris and the surface of the bed for both the knee joints, all the data for patients’ group were observed at increasing values at higher significant (P<0.001) level for both males and females groups when compared to control groups and R values were observed within the range of 87% - 96%, which had strong correlation between experimental and control groups.

Measurements of diameter of group of calf muscles for both the knee joints were found to be different from each other in Table 2B. Although some of the patients reported any pain either in the knee joints or lumbar region. It was observed that the mismatched differences of the diameter of calf muscles were cumulative effects of muscular wasting of gastrocnemius muscles due to prolonged use of knee supports or such other reasons. To be noted that calf muscles are very important for the alignment of spinal vertebrae. Slight difference of diameters between the two calf muscles of two legs can trigger compression in the lumbar vertebrae.

In case of diameter of calf muscles, it was observed from all the data for patients’, an increasing trend in all males of age groups of 40-50 and 51-60 years at highly significant (P<0.001) and R values had weak to strong correlation within the range of 28% - 82%, but the age groups of 61-70 and 71->80 years, the data were increased without significance, while in female groups, it was observed significant decreasing trend (P<0.05 and P<0.01) for age groups of 61-70 and 71->80 years and age groups of 40-50 and 51-60 years were found no significant changes.

Measurements of diameter of thigh muscles were different from each other as shown in Table 2C. Although some of the patients were not reported any pain neither in the lumbar region nor one of the knee joints. During measurement of the thighs, it was noticed that unequal differences in diameter of both the thigh muscles were the cumulative
effects of muscular wasting / muscular bulging in the posterior part of the thighs such as rectus femoris, vastus lateralis, vastus medialis, sartorius (part of the originated area), semitendinosus, long head of biceps femoris, semimembranosus, adductor magnus in particular. Moreover the nerve root of semimembranosus and semitendinosus are sciatic nerve (tibial, L 5, S1, S2,) originating from the tuberosity of the ischium and inserting to tibia (pes anserinus). The patients complained about the sensation of severe or mild pain only in the lumbar region or in one of the knee joints although degenerative changes both in the knee joints and the lumbar region irrespective of age, sex, body weight, lifestyle and ethnic barriers.

In case of diameter of thigh muscles, it was observed that data for all age groups of males were increased significantly (P<0.05 and P<0.01) except the age group of 71 ->80 while in females all the values

Table 1B: Statistical analysis of male and female patients different age groups reporting to the clinic for treatment of pain in right knee joint or left knee joint or lumbar region as per sensation of pain reporting scale combined with A and B categories.

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<tr>
<th></th>
<th>(40-50) yrs / N=51</th>
<th>(51-60) yrs / N=150</th>
<th>(51-70) yrs / N=139</th>
<th>(71 -&gt; 80) yrs / N=55</th>
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<td>CONTROL (40- &gt; 80) (N=90) Mean (SE)</td>
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<tr>
<td>Right leg</td>
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<td>2.5 (0.07)</td>
<td>2.69 (0.06)</td>
<td>2.65 (0.04)</td>
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<td>Right leg</td>
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<td>36.00 (0.66)</td>
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<td>Right leg</td>
<td>45.21 (0.83)</td>
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<td>Right leg</td>
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<td>36.48 (0.41)</td>
<td>37.20 (0.43)</td>
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Table 2: Measurement of knee gaps between the short head of biceps femoris and the surface of the bed (2A), diameter of group of calf muscles (2B), diameter of group of thigh muscles (2C), diameters of group of muscles connected with knee joints, 4 cm above the patella (2D), diameters of group of muscles connected with knee joints, 4 cm below the patella (2E) and WOMAC Index (2F) and their statistical analysis of 485 patients of age group (40 ->80) years having degenerative changes of both the knee joints and the lumbar region irrespective of age, sex, body weight, lifestyle and ethnic barriers.
were decreased significantly (P<0.05, P<0.01 and P<0.001) in all age groups when compared to control groups.

Measurements of diameter of group of muscles connected with knee joint, 4 cm above the patella were differed from each other's as given in Table 2D. It was observed that the mismatched differences of diameters in the knee joints were the cumulative effects of muscular wasting, inflammation, effusion or blood clotting due to engorgement of saphenous vein. Because the four muscles namely sartorius, gracilis, semitendinosus and semimembranosus were all inserting to tibia (pes anserinus) and 90% of the patients suffering from osteoarthritis on knee joints were reported the acute pain on the connecting area of the above mentioned four muscles in the medial part of the knee. Moreover, radiological reports reflected the degenerative changes that simultaneously occur in the lumbar region and in both the knee joints irrespective of whether severe pain was felt by the patient either in the lumbar region or knee joints.

In case of diameter of group of muscles connected with the knee joints, 4 cm above the patella, it was found an increasing trend of statistically significant (P<0.05, P<0.01 and P<0.001) data for males of all age groups except the age group of 51-60 years while in females only age group of 61-70 showed significant (P<0.05) but rest of the age groups were not observed significant data.

Measurements of diameter of group of muscles connected with knee joint, 4 cm below the patella were different from each other as given in Table 2E. Although some of the patients were not reported any pain simultaneously in the lumbar region and both the knee joints. Usually, they reported of severe pain either in the lumbar region or any of the knee joints. It was observed that mismatched differences of diameter of the areas below the knee joint were the cumulative effect of muscular wasting, inflammation, effusion or blood clotting on the anterior, posterior, lateral and medial parts of lower leg the tibialis anterior, extensor hallucis longus and digitorum longus, gastrocnemius, achilles tendon, flexor digitorum longus, flexor hallucis longus, fibularis longus and brevis soleus etc were badly affected during degenerative changes occur in both the knee joints and lumbar regions.

In case of diameter of group of muscles connected with the knee joints, 4 cm below the patella, it was observed that in males values increased (P<0.01) and decreased (P<0.05) significantly of the age groups of 40-50 and 61-70 years while in females, decreased significantly in the age groups of 40-50 (P<0.05) and 71 -80 (P<0.001) respectively when compared to control group.

The author has already established that symmetry between both legs can be achieved with the help of phytotherapeutic treatment protocol as evident from the anatomical measurement, which tallied with the control group figures. At the same time the removal of compression in the lumbar vertebrae regions as well as significant opening up of joint spaces along with marked reduction the genu verum on both knee joints were achieved [8].

Measurements of knee flexions were found to be different from each other as given in table 3A – 3C. Although some of the patients were not reported any severe pain simultaneously in the lumbar region and both the knee joints. It was observed that mismatched differences of angle of flexions in supine, prone and standing positions of different patients were widely different. The two main actions of knee joint are flexion and extension with the ability to rotate slightly Most of the muscles that move these joints located in the thighs with the exception of the gastrocnemius and popliteus. The muscles responsible for knee flexions are biceps femoris - nerve root is sciatic nerve for long head and common peroneal nerve for short head, semimembranosus and semitendinosus (nerve root is sciatic nerve [tibial L5, S1, S2 ] for both the muscles). Gracilis (nerve root is anterior branch of obturator), sartorius (nerve root is femoral nerve), popliteus (nerve root is tibial nerve) and gastrocnemius (nerve root is tibial nerve from the sciatic, specifically nerve root S1, S2). Degeneration was simultaneously occurred in both the knee joints and lumbar region whether the pain were felt or not during the compression of the sciatic nerve. Degeneration in the lumbar region had also occurred. This is proved from the radiological reports of both the knee joints and lumbar region shown in the figures [12-23].

The author already established with the help of the phytotherapeutic treatment protocol normal flexions of knee joints in supine, prone and standing positions made them symmetrical and brought them back to normal limits to (140° - 145°), (130° - 135°) and (130 - 135°) respectively and at the same time rectification of total degenerative changes on both the knee joints and lumbar region were removed as evident by pathological and radiological reports [8].

Another important parameters, in case of measurements of knee flexion in supine, prone and standing positions both in males and females were decreased with highly significant (P<0.001) value and R values had strong correlation ranges between 81% - 97%, 60% - 96% and 71% - 99% respectively for both right and left legs. These were observed in all age groups when compared to control groups.

Measurements of knee extensions were different from each other as given in Table 3D – 3F. Although some of the patients were not reported any severe pain simultaneously in the lumbar region and both the knee joints. It was observed that angle of extensions in supine, prone and standing positions of different patients were widely different. The muscles responsible for knee extension rectus femoris and medialis, vastus lateralis, vastus intermedius and rectus femoris and all inserting to patella via the quadriceps tendon and tibial tuberosity via the patellar ligament and the nerve roots of all the muscles are femoral nerve. The degenerative changes were occurred simultaneously on both the knee joints and lumbar region but severe pain felt only in one knee joint or both the knee joints. The degenerative changes were depicted in the figures [12-23]. The author already established with the help of the phytotherapeutic treatment protocol normal extensions of knee joints in supine, prone and standing positions made them symmetrical and brought them back in normal limits to (0° - 10°) each and at the same time rectification of total degenerative changes of both the knee joints and lumbar region were removed as supported by pathological and radiological reports [8].

In case of measurements of knee extension in supine, prone and standing positions both in males and females were increased with highly significant (P<0.001) value and R values had strong correlation ranges between 79% - 99%, 61% - 98% and 51% - 96% respectively for both right and left legs. These were observed in all age groups when compared to control groups.

Patients were also clinically examined. C-reactive protein- C.R.P [12], muscle creatine phosphokianse – C.P.K (13] and aldolase (14] are three clinical markers which increase in their activities during inflammation. The author already established with the help of phytotherapeutic treatment protocol [8] these increase in activities of above parameters are decreased to normal level. The values of biochemical parameters were higher in relation to the maximum limit prescribed (Table 4).
Recent advances in technology, selective and efficacious medicines have enabled us to understand the complex processes involved in the generation of arthritic pain. But some questions still remain unanswered like, why is some arthritic pain episodic, whereas other pain takes over. It may be certain expressions of nociceptors are required actually damages it then the pain receptors, also known as nocieptors, can feel when there are degenerative changes in the lumbar region due to compression of disc space. But we have found in our examinations that disc compression at the lumbar region always lead to degenerative changes in the knee joints, whether pain is felt or not. At the same time degenerative tissue damage in the knee region is always marked by compression of the disc at the lumbar region, whether pain is felt or not.

An important aspect of the present study was to assure that all the measurements parameters are suitable tool to identify the painful disease like osteoarthritis. Many researchers have been documented that knee pain, stiffness, unable to movements and body fitness are the common diagnostic factors for osteoarthritis [16-18]. It was found that pain score evaluation and functional disability as parameters studied by researchers and also biochemical and hematological parameters during treatment [19-23] but no one has attempted this easy screening tool in the present work for osteoarthritis patients. Further research is required emphasizing with these parameters during treatment of osteoarthritis to analysis the recovering result by the treatment.

Table 3: Measurement of knee flexion in supine position (3A), in prone position (3B), in standing position (3C), knee extension in supine position (3D), in prone position (3E), in standing position (3F) and their statistical analysis of 485 patients of age group (40 - >80) years having degenerative changes of both the knee joints and the lumbar region irrespective of age, sex, body weight, life style and ethnic barrier.

Conclusion

Recent advances in technology, selective and efficacious medicines have enabled us to understand the complex processes involved in the generation of arthritic pain. But some questions still remain unanswered like, why is some arthritic pain episodic, whereas other patients complain of chronic and persistent joint pain? [9]. This is because, the mechanoreceptors located in the skin, are sensitive to pressure as well as stretching (light to moderate). They send messages through the neurons and the central nervous system which interprets these messages as tactile sensations. But when the mechanical pressure on a body tissue becomes so strong that it threaten its integrity or actually damages it then the pain receptors, also known as nociceptors, take over. It may be certain expressions of nociceptors are required to feel pain [10, 11]. We have observed that knee joint pain may not be felt when there are degenerative changes in the lumbar region due to compression of disc space. But we have found in our examinations that disc compression at the lumbar region always lead to degenerative changes in the knee joints, whether pain is felt or not. At the same time degenerative tissue damage in the knee region is always marked by compression of the disc at the lumbar region, whether pain is felt or not.
Table 4: The biochemical parameters of 395 patients (145 males and 250 females) having degenerative changes/reduction of joint spaces between the bones/vertebrae.

<table>
<thead>
<tr>
<th>CRP (mg/l)</th>
<th>CPK (µ/l)</th>
<th>Aldolase (µ/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>M=20 (39%)</td>
<td>F=31 (61%)</td>
<td>2.15 (0.64)</td>
</tr>
<tr>
<td>M=40 (27%)</td>
<td>F=110 (73%)</td>
<td>8.75 (5.30)</td>
</tr>
<tr>
<td>M=40 (29%)</td>
<td>F=139 (71%)</td>
<td>6.75 (3.61)</td>
</tr>
<tr>
<td>F=99 (71%)</td>
<td>M=135 (82%)</td>
<td>9.35 (10.25)</td>
</tr>
<tr>
<td>M=45 (82%)</td>
<td>F=10 (18%)</td>
<td>2.85 (2.33)</td>
</tr>
<tr>
<td>F=10 (18%)</td>
<td>M=50 (20%)</td>
<td>12.75 (9.54)</td>
</tr>
<tr>
<td>F=10 (18%)</td>
<td>M=40 (20%)</td>
<td>4.25 (2.76)</td>
</tr>
<tr>
<td>F=10 (18%)</td>
<td>M=50 (20%)</td>
<td>4.80 (2.40)</td>
</tr>
</tbody>
</table>

Normal Range: CRP (with Titra method): upto 8mg/l, CPK (UV Konetic, DGKC & IFCC): 29.00 - 133.00 (µ/l), Aldolase (Enzymatic with TIM & GDH): 0.3 - 7.60 (µ/l)


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