

Comparing the Efficacy between C-Arm Guided Methylprednisolone Injection and Platelet-Rich Plasma Injection at Sacroiliac Joint in Ankylosing Spondylitis Patients

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ABSTRACT

Background: Ankylosing spondylitis is an autoimmune inflammatory disease that comes under the group of diseases known as seronegative spondyloarthropathy (SpA). The axial skeletal and sacroiliac joint is the most common joint involved in ankylosing spondylitis. It leads to inflammation of the joint causing pain at the sacroiliac joint. Intra-articular sacroiliac joint Platelet-rich plasma injection and steroid injection, both help in reducing the pain and improving the functional status of patients suffering from chronic low back pain due to sacroiliitis.

Aim and Objective: To compare the effect of intra-articular methylprednisolone injection and PRP injection at the sacroiliac joint in patients with ankylosing spondylitis in reducing pain.

Material and Methods: This is a randomized, prospective comparison study, done for 16 months. A total of 40 ankylosing spondylitis patients with sacroiliac joint pain, fulfilling the inclusion criteria were selected for the study and divided into Group A and Group B with 20 patients in each group. Group A patients underwent intra-articular sacroiliac joint PRP injection and Group B patients received intra-articular sacroiliac joint methylprednisolone injection. All the participants were evaluated by NPRS for back pain due to sacroiliitis and Oswestry Disability Index at 0, 2nd, 4th, 6th week, and 3 months.

Result: A total of 40 patients with ankylosing spondylitis with sacroiliac joint pain were analyzed. In group A around 17 out of 20 (85%) patients and in group B around 3 patients out of 20 (15%), had >50 % reduction in pain based on NPRS for sacroiliac joint pain at 3 months. 16 patients out of 20 (80%) patients in group A and 3 patients out of 20 (15%) patients in group B improved to minimal disability from severe disability on the ODI scoring scale at 3 months.

Conclusion: We conclude that intra-articular sacroiliac joint PRP and methylprednisolone injection both are effective in back pain due to sacroiliitis in ankylosing spondylitis patients. The reduction in the intensity of pain and function disability improvement is more and longer-lasting with intra-articular PRP injection compared with steroid (methylprednisolone) injection.

Keywords: Ankylosing spondylitis, sacroiliac joint injection, sacroiliitis, platelet-rich plasma, methylprednisolone, numeric pain rating scale, Oswestry disability index.

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INTRODUCTION

Ankylosing spondylitis (AS) is an autoimmune inflammatory disease that is strongly associated with the Human Leukocyte Antigen-B27 (HLA-B27) gene in 85 to 95% of cases^{1,2}. AS comes under the group of diseases known as seronegative spondyloarthropathy (SpA).³ Usually, the age of onset of the disease is between 18 years to 45 years⁴. AS is more common in males than females (2 to 3:1)^{5,6}.

The most common joints involved in AS are the axial skeletal and sacroiliac joint (SIJ)^{7,8}. Sacroiliitis is a common manifestation of SpAs. Tenderness at SIJ is examined by Gaenslen's test, Compression test, Flexion Abduction, and External rotation (FABER) test, Fortin finger test, Gapping test (distraction test), and shear test (thigh thrust test)⁹. An anteroposterior view of the pelvis shows the involvement of sacroiliitis, which is graded as – grade 0 (normal),

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grade 1 (suspicious changes), grade 2 (a small localized area of erosion or sclerosis, without alternation in joint width), grade 3 (definite changes of erosion, sclerosis, widening, narrowing or partial ankylosis), grade 4 (total ankylosis)¹⁰. Spinal radiograph shows sclerosis, erosion at edges of vertebral bodies, and squaring which progresses to syndesmophyte formation and ossification of spinal ligaments. The classical characteristic of AS in spine radiographs is Bamboo Spine¹¹.

It also presents with peripheral joint pain (ankle, hip, knee, shoulder, sternoclavicular joint, costosternal and costovertebral joint), enthesitis, dactylitis^{12,13}, or ocular manifestations (anterior uveitis)¹⁴.

Early diagnosis of AS is very important for further management and reducing the disease progression. Criteria developed for assessment of AS are Modified New York criteria¹⁵ (based on clinical and radiological criteria), and Assessment of Spondylarthritis International Society (ASAS) criteria¹⁶.

Modified New York Criteria is based on Clinical criteria (low back pain and stiffness for more than 3 months, limitation of the lumbar spine motion in the sagittal and frontal plane, limitation of chest expansion) and radiological criteria (bilateral sacroiliitis grade 2 or more and unilateral grade 3-4). Definite AS if the radiological criteria are associated with at least one clinical criterion¹⁵.

An outline of AS treatment goals is provided by the European League Against Rheumatism (EULAR) and Assessment of Spondyloarthritis International Society (ASAS). It includes medical, rehabilitation, and surgical treatment^{17,18}. The treatment goal of AS includes relieving symptoms, optimizing function, and intercepting the structural damage to the spine¹⁹.

Primary pharmacological treatment of AS involves NSAIDs, biological Disease-modifying antirheumatic drugs (bDMARDs) such as TNF-alfa inhibitors (Infliximab, Etanercept), and IL17 inhibitors (Secukinumab), Janus Kinase Inhibitors (Tofacitinib) and other DMARDs like methotrexate and sulfasalazine^{20,21}. NSAIDs are considered as first-line therapy for AS²⁰ but sometimes they are insufficient in controlling the disease and due to side effects, they cannot be used as long-term therapy.

In patients with SpA, who do not have significant clinical signs other than sacroiliitis, local intra-articular sacroiliac joint injection is one of the best and least invasive procedures to control SIJ pain²². The gold standard for Intra-articular SIJ injection involves targeting the inferior third of SIJ under fluoroscopy guidance²³.

In this study, we would like to compare the effect of intra-articular PRP vs methylprednisolone injection at SIJ in previously diagnosed Ankylosing Spondylitis patients.

PRP is an autologous blood-derived product, which can be exogenously applied to various tissues. Platelets are rich in anabolic growth factors and anti-inflammatory cytokines, which stimulate cellular proliferation, migration differentiation, angiogenesis, and extracellular matrix synthesis^{24,25}. Alfa granules of platelets are the source of growth factors (GF) like Platelet-derived growth factor (PDGF), fibroblast growth factor (FGF), transforming growth factor beta-1 (TGF), vascular endothelial growth factor (VEGF), insulin-like growth factor -1 (IGF)²⁶. Local injection of PRP has been used effectively in the treatment of musculoskeletal pathologies, such as muscle, tendon, or ligament injury, and degenerative joint diseases.

Intra-articular SIJ PRP injection has been associated with a significant reduction in pain, disability, and functional limitations, also it improves structural integrity and mechanical strength²⁷. In the study conducted by *Wallace et. al.* on USG-guided intra-articular SIJ PRP injection in SIJ dysfunction, it was found that pain reduction and disability of patients were significantly reduced and lasted up to 6 months after the procedure²⁸.

Corticosteroids have anti-inflammatory effects by inhibiting Phospholipase A2 and neural conduction of nociceptive C-fiber. It has also the property of inhibiting prostaglandin synthesis. Corticosteroids enhance the blood flow, stabilize the cell membrane, and suppress immune mediators²⁹. Previous studies have suggested that local steroid injection helps in reducing the pain at SIJ^{30,31}. Types of corticosteroids used for intra-articular injections are Methylprednisolone, Triamcinolone, or Betamethasone. *Serdar Kokar et. al.*³⁰ in Turkey evaluated the role of SIJ steroid injection in axial SpA and concluded that there was a >50% reduction in the Numeric rating scale score of pain compared with baseline.

Minimal adverse effects have been associated with intra-articular SIJ injections. The most common side effects reported after the injection procedure are vasovagal reactions and an increase in pain and soreness³². Rarely, more serious complications reported after SIJ injection are hematoma, accidental intervertebral foramen injection, abscess, sciatic palsy, or trauma to the nerve³³. Radiation exposure to both patient and clinician is a concern with fluoroscopyguided SIJ injections.

MATERIAL & METHOD

This is a Randomized, Prospective Comparison study done for 16 months duration. Cases were selected as per inclusion and exclusion criteria. The aim of the study and procedure were explained to the patients and written consent was taken from patients, who agreed to participate. A thorough history and physical examination were done.

A total of 40 patients with already diagnosed ankylosing spondylitis by Modified New York criteria

and having sacroiliac joint tenderness were selected for the study. They were divided into two groups randomly – Group A and Group B with 20 patients in each group.

The inclusion criteria of the study were – 1) Patients from age 18 to 45 years. 2) Axial SpA patients who are already diagnosed with ankylosing spondylitis by Modified New York criteria. 3) Patients with positive sacroiliac joint tenderness. 4) Sacroiliitis grade 1 to 3 in anteroposterior view of the pelvis. 5) Patient with intact cognitive function. 6) patient with written consent.

The exclusion criteria of the study were – 1) Cases with systemic infection. 2) Cases with local infection at entry site. 3) Pregnancy. 4) Allergy to steroid, local anesthetic, contrast. 5) Immunocompromised patients. 6) Bleeding diathesis, malignancy. 7) patients with severe cardiovascular, respiratory, renal, and hepatic disease. 8) Patients with uncontrolled diabetes. 9) Patients with extraskkeletal manifestation. 10) Sacroiliitis grade 4 in anteroposterior view of pelvis. 11) patients on Tumour Necrosis Factor (TNF) inhibitors.

All patients, diagnosed with ankylosing spondylitis, and positive sacroiliac joint tenderness by provocation test and anteroposterior radiological view of the pelvis, managed conservatively for 3 weeks and they received NSAIDs and physical therapy as per requirement. Patients who had persisting symptoms after 3 weeks were called in the outpatient department and consent was taken to participate in the study. Patients were divided into two groups randomly – Group A and Group B. Group A patients received intra-articular sacroiliac joint PRP injection and Group B patients received methylprednisolone injection.

In this study, we have used the Numeric Pain Rating Scale (NPRS) and Oswestry Disability Index (ODI) an index derived from the Oswestry Low Back Pain Questionnaire, for assessing the patients at baseline, 2nd, 4th and 6th week and 3 months.

Platelet Rich Plasma Preparation: As there is no standardized protocol for the PRP preparation method, PRP was prepared by the single spin centrifugation technique in this study. Around 10ml autologous peripheral venous blood was collected from the patient and then anticoagulated with 1.5ml sodium citrate solution. After that, anticoagulated blood was followed by single spin centrifugation at 3000 rpm for 10 minutes to separate the red blood cells and concentrate the platelets. The centrifugation was done to obtain a plasma sample having a higher concentration of platelets than the whole blood. Around 2 ml PRP was obtained which was injected immediately after centrifugation at the sacroiliac joint.

Interventional Procedure: The sacroiliac joint injection was given under strict aseptic precautions by using a C-arm. The patient was placed in a prone position. First, an injection of lignocaine 2% 4ml was

administered as local anesthesia. The inferior border of the SI joint (the point where anterior and posterior joint lines overlap) was identified by tilting the C-arm around 20 degrees towards the contralateral side. Then a 22G cutting-edge spinal needle was advanced in medial to lateral approach to the inferior border of the sacroiliac joint and intra-articular placement is expected. An Anteroposterior (AP) view was obtained to ensure that the needle tip is located intra-articular. A lateral view was taken to rule out the ventral defect in the capsule. Contrast injection (1ml Iohexol dye + 1ml 0.9% normal saline) confirmed the needle position in both AP and lateral views, displaying intra-articular and nonvascular spread. After ensuring needle position, the patient under group A received 2ml of freshly prepared PRP was injected at the sacroiliac joint.

Patients under group B received an injection of Methylprednisolone 40mg (1ml) + injection Lignocaine 2% (1ml) at the intra-articular SIJ. At last, the needle was withdrawn, and pressure was maintained at the injection site to prevent bleeding.

After the procedure, it was advised to patients to continue physical therapy at home and again they were called after 2 weeks for further assessment for NPRS and ODI. A similar assessment was done again on the 4th and 6th week and then at 3 months.

Statistical Analysis: All continuous variables were presented as Mean $\pm$ SD and were compared by independent sample t-test for normal data or Mann-Whitney U test for nonnormal data. All qualitative variables were expressed as numbers and percentages and were compared by Chi-square test or Fisher's exact test. A p-value <0.05 was considered statistically significant. Statistical software SPSS 21.0 was used for analysis.

RESULTS

In this study, 40 diagnosed ankylosing spondylitis patients with sacroiliac joint pain were divided into two groups. Group A and B with 20 patients in each group randomly. Group A patients were given an Intra-articular sacroiliac joint PRP injection and Group B was given Methylprednisolone injection.

In group A, the mean age was 30.40 ± 8.22 years and 29.90 ± 6.73 years in group B. There was no statistically significant difference in age ($P=0.834$) (**FIGURE 1**). There was male predominance in both groups without any significant difference statistically ($p=1.00$) (**FIGURE 2**). There was no statistical difference among groups for BMI. ($P=0.742$) (**TABLE 1**).

At baseline, there was no statistically significant difference in NPRS $p=0.587$. In the 2nd week of follow-up, there was a decrease in NPRS between groups, but there were no statistically significant differences $p=0.086$. There was a statistically significant difference in NPRS between groups at 4 weeks. In group A, THE mean NPRS was 2.15 ± 1.04 and 3.20 ± 1.01 ($p=0.002$) in group B. There was a

statistically significant difference in NPRS between groups at 6 weeks. In group A, the mean NPRS was 1.50 ± 0.83 and 4.15 ± 1.23 ($p < 0.0001$) in group B. (FIGURE 3).

In the 2nd week, 7 patients (35%) in group A had more than 50% reduction of NPRS from baseline; in group B, 11 patients (55%) had more than 50% reduction of NPRS from baseline. There was no statistically significant difference between groups $p = 0.204$. In the 4th week, 15 patients (75%) in group A had more than 50% reduction of NPRS from baseline; in group B, 10 patients (50%) had more than 50% reduction of NPRS from baseline. There was no statistically significant difference between groups $p = 0.102$. In the 6th week, 17 patients (85%) in group A had more than 50% reduction of NPRS from baseline; in group B, 6 patients (30%) had more than 50% reduction of NPRS from baseline. There was a statistically significant difference present between groups $p < 0.0001$. (FIGURE 4).

At baseline, there was no statistically significant difference in ODI $p = 0.841$. All patients had a severe disability in both groups. There was a statistically significant difference in ODI between groups at 2 weeks. In group A, the mean ODI was 30.70 ± 6.56 and 19.00 ± 5.45 ($p < 0.0001$). There was no statistically significant difference in ODI between groups at 4 weeks. In group A, the mean ODI was 21.30 ± 5.04 and 20.20 ± 5.06 ($p = 0.495$) in group B. There was a statistically significant difference in ODI between groups at 6 weeks. In group A, the mean ODI was 16.80 ± 5.08 and 25.20 ± 6.17 in group B ($p < 0.0001$). (FIGURE 5).

At 3 months, in group A, 4 patients (20%) had a moderate disability and 16 patients (80%) had a minimal disability. Whereas in group B, 17 patients (85%) had a moderate disability and 3 patients (15%) had a minimal disability at 3 months. (FIGURE 6).

DISCUSSION

This is a Randomized, Prospective Comparison study done for 16 months period. A total of 40 patients with sacroiliac joint tenderness, who were already diagnosed as Ankylosing Spondylitis by Modified New York criteria, were included in this study. Patients were divided into two groups randomly (Group A and Group B) with 20 patients in each group.

In Group A, Intra-articular PRP injection was given at the sacroiliac joint and intra-articular Methylprednisolone injection was given in Group B. The outcome measures in both groups were analyzed with the Numeric Pain Rating Scale (NPRS), and Oswestry Disability Index (ODI).

In this study, the mean age of patients in Group A was 30.40 ± 8.22 , and in Group B was 29.90 ± 6.73 . There was no statistically significant difference found in age distribution between both groups ($p = 0.834$). This finding was in concordance with a study conducted by

Ernst et. al.⁴ in 2003, who found that the mean age of disease onset in HLA-B27 positive is 24.8 years and 27.7 years in HLA-B27 negative AS patients. There was male predominance in both groups without any significant difference statistically ($p = 1.00$). Similarly, **Margarita et. al.**³⁴ in 2016 did an observational cross-sectional study and found male predominance in AS patients. The mean body mass index (BMI) in group A was 23.44 ± 1.06 and in group B 23.33 ± 0.94 ($p = 0.742$). In this study, 95% of patients in both groups were found HLA-B27 positive which implies the strong association of HLA-B27 with ankylosing spondylitis corroborated by a metanalysis conducted by **Hai Lin et.al.**² in 2017, where it was concluded that there is a strong correlation of HLA-B27 (85%-95%) with ankylosing spondylitis **Raj Singh et. Al.**³⁵.

The numeric pain rating scale for sacroiliac joint pain revealed severe pain in both groups A and B at the baseline. After intra-articular PRP injection at SIJ in Group A, the patient's pain scale was improved from severe (7.05 ± 1.19) to mild (3.55 ± 1.00) at the first follow-up on the 2nd week whereas, in Group B where intra-articular methylprednisolone injection at SIJ was given, the patient's pain scale was improved from severe (7.25 ± 1.12) to mild (2.95 ± 1.15) at the first follow-up on the 2nd week. In group A, the patients continued to have mild pain at the end of 4th (2.15 ± 1.04), 6th week (1.50 ± 0.83), and 3 months (1.55 ± 0.83). In group B, the patients continued to show mild pain in the 4th week (3.20 ± 1.01) but moderate pain at the end of the 6th (4.15 ± 1.23) and 3 months (5.00 ± 1.45) follow-up. There was no significant correlation found between the decreased score of NPRS and other parameters like age, sex, BMI, and pain provocation test. In this study, around 35% of patients in Group A had a >50% reduction in NPRS score from baseline at 2 weeks follow-up, whereas in Group B, 55% of patients had a >50% reduction ($p = 0.204$). In the 4th week 75% of patients in Group A and 50% of patients in Group B ($p = 0.102$), were having a >50% reduction in NPRS score. At the 6th week and 3 months, 85% of patients of Group A and 30% and 15% of patients respectively from Group B

($p < 0.0001$) had >50% NPRS score reduction from baseline. This result is in concordance with the study performed by **Navani et. Al.**²⁷ in 2015, on 10 patients and after 12 months of followups post-injection there was a >50% reduction in the Verbal Analog scale (VAS) score in 100% of patients and none of the patients showed any adverse reactions. Similarly, **Ko et. al.**³⁶ (2017) did a case series on intra-articular sacroiliac joint PRP injection and follow-up for 1 year. It was concluded that there was a marked improvement in joint stability and a significant reduction in pain which was maintained up to 4 years post-treatment. **Varun Singla et. al.**³⁷ also found that PRP was effective in 60% and 90% of patients while steroids were effective in 75% and 25% of patients at 2 weeks and 3 months.

Oswestry Disability Index is calculated based on Oswestry's low back pain questionnaire, in this study both groups A and B showed severe disability at the baseline with $p = 0.841$ with no significant difference. After Intra-articular SIJ PRP injection in group A, patients improved from severe disability (59.10 ± 9.05) to moderate disability overall with a mean difference of 30.70 ± 6.56 , and 21.30 ± 5.04 in 2nd and 4th week, respectively. In the 6th and 3 months, it improved to the minimal disability with a mean of 16.80 ± 5.08 and 16.70 ± 4.46 , respectively. In group B, after intra-articular SIJ methylprednisolone injection, patients showed improvement from severe disability (59.70 ± 9.76) to minimal disability in the 2nd (19.00 ± 5.45) and 4 h week (20.20 ± 5.06). but at the 6th week and 3 months, ODI progressed to moderate disability with a mean of 25.20 ± 6.17 and 29.60 ± 6.54 respectively.

Improvement in ODI score was noted in both groups. In group A, 80% improved to minimal disability and 20% to moderate disability after 3 months of the procedure. However, in group B, 15% of patients showed minimal disability and 85% had a moderate disability. There was a statistically significant ($p < 0.0001$) improvement in group A than in group B.

Similar results were reported in the prospective non-randomized study conducted by **Wallace et. al.**²⁸ in 2020, on 50 patients after ultrasound-guided intra-articular PRP injection. They concluded that there was a significant mean decrease in ODI and NPRS at 6 months compared with baseline values (mean = -9.79%, 95%, Confidence Interval [CI] = -6.06 to -13.52) and (mean = -1.94, 95% CI = -1.14 to -2.78), respectively. The most improvement was seen at 4 weeks after injection. **Varun Singla et. al.**³⁷, compared the effect of PRP and steroids in sacroiliac joint pain on 30 patients and found similar results showing significant improvement in ODI score at 2, 4, 6 weeks, and 3 months after PRP injection, and the present benefit was increased at each follow-up from baseline

LIMITATION OF STUDY

The study has been done in a single center only and the sample size in this study was small. Blinding was not done at the level of the patient receiving the specific treatment and at the level of outcome assessment. This could have introduced bias in the study. The follow-up period in this study was 3 months, which is not enough to evaluate the effect of treatment in chronic pain of sacroiliac joints in ankylosing spondylitis. In this study, only NPRS and ODI scoring systems were used. No scoring system was used to assess the ankylosing spondylitis disease activity and functional outcome.

CONCLUSION

Therefore, we conclude that intra-articular sacroiliac joint PRP and methylprednisolone both are effective in back pain due to sacroiliitis in ankylosing spondylitis patients. The reduction in the intensity of pain and function disability improvement is more and longer-

lasting with intra-articular PRP injection compared with steroid (methylprednisolone) injection.

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REFERENCE

- 1) Khan MA. Epidemiology of HLA B27 and arthritis. *Curr Opin Rheumatol.* 1996;15(1):10–12.
- 2) Lin H, Gong YZ. Association of HLA-B27 with ankylosing spondylitis and clinical features of the HLA-B27-associated ankylosing spondylitis: a meta-analysis. *Rheumatol Int.* 2017 Aug; 37(8):1267-1280.
- 3) Braun J, Sieper J. Ankylosing spondylitis. *Lancet* 2007; 369: 1379–1390.
- 4) Feldtkeller E, Khan MA, van der Heijde D, van der Linden S, Braun J. Age at disease onset and diagnosis delay in HLA-B27 negative vs. positive patients with ankylosing spondylitis. *Rheumatol Int.* 2003;23(2):61-66.
- 5) De Winter JJ, van Mens LJ, van der Heijde D, Landewé R, Baeten DL. Prevalence of peripheral and extra-articular disease in ankylosing spondylitis versus non-radiographic axial spondyloarthritis: a meta-analysis. *Arthritis Res Ther.* 2016;18:196.
- 6) Rudwaleit M, Haibel H, Baraliakos X, et al. The early disease stage in axial spondylarthritis: results from the German Spondyloarthritis Inception Cohort. *Arthritis Rheum.* 2009;60(3):717- 727.
- 7) Strand V, Singh JA. Evaluation and management of the patient with suspected inflammatory spine disease. *Mayo Clin Proc.* 2017;92(4):555-564.
- 8) Proft F, Poddubnyy D. Ankylosing spondylitis and axial spondyloarthritis: recent insights and impact of new classification criteria. *Ther Adv Musculoskelet Dis.* 2018;10(5-6):129-139.
- 9) Telli H, Telli S, Topal M. The Validity and Reliability of Provocation Tests in the Diagnosis of Sacroiliac Joint Dysfunction. *Pain Physician.* 2018 Jul;21(4): E367-E376.
- 10) Bennett P, Burch T. Population studies of rheumatic diseases. Amsterdam, The Netherlands: Excerpta Medica Foundation, 1968; 456-457.

- 11) Braun J, van der Heijde D, Dougados M, et al. Staging of patients with ankylosing spondylitis: a preliminary proposal. *Ann Rheum Dis.* 2002;61(suppl 3):iii9-iii23.
- 12) Yamamoto T. Optimal management of dactylitis in patients with psoriatic arthritis. *Open Access Rheumatol.* 2015;7:55-62.
- 13) Kataria RK, Brent LH. Spondyloarthropathies. *Am Fam Physician.* 2004;69(12):2853-2860.
- 14) Rosenbaum JT. Uveitis in spondyloarthritis including psoriatic arthritis, ankylosing spondylitis, and inflammatory bowel disease. *Clin Rheumatol.* 2015;34(6):999-1002.
- 15) Van der Linden S, Valkenburg HA, Cats A. Evaluation of diagnostic criteria for ankylosing spondylitis. A proposal for modification of the New York criteria. *Arthritis Rheum* 1984;27:361-368.
- 16) Rudwaleit M, van der Heijde D, Landewé R, et al. The development of Assessment of SpondyloArthritis international Society classification criteria for axial spondyloarthritis (part II): validation and final selection [published correction appears in *Ann Rheum Dis.* 2019;78(6):e59]. *Ann Rheum Dis.* 2009;68(6):777-783.
- 17) Van den Berg R, Baraliakos X, Braun J, van der Heijde D. First spondylitis with nonpharmacological treatment and non-biologic drugs: a systemic literature review for the ASAS/EULAR management recommendations in ankylosing spondylitis. *Rheumatology (Oxford)* 2012; 52: 1756-1765.
- 18) Baraliakos X, van den Berg R, Braun J, van den Heijde D. Update of literature review on treatment with biologics as a basis for the first update of ASAS/EULAR management recommendation of ankylosing spondylitis. *Rheumatology (Oxford)* 2012;51: 1378-1387.
- 19) Ward MM, Deodhar A, Gensler LS, et al. 2019 Update of the American College of Rheumatology/Spondylitis Association of America/Spondyloarthritis Research and Treatment Network recommendations for the treatment of ankylosing spondylitis and nonradiographic axial spondyloarthritis. *Arthritis Rheumatol.* 2019;71(10):1599-1613.
- 20) Sari İ, Öztürk MA, Akkoç N. Treatment of ankylosing spondylitis. *Turk J Med Sci.* 2015;45(2):416-430.
- 21) Ward, M. M. et al. American college of rheumatology/spondylitis association of America/spondyloarthritis research and treatment network 2015 recommendations for the treatment of ankylosing spondylitis and non-radiographic axial spondyloarthritis. *Arthritis Rheuma.* (2016) 68, 282-298.
- 22) Gupta S. Double-needle technique: An alternative method for performing difficult sacroiliac joint injections. *Pain Physician* 2011; 14:281-284.
- 23) Maugars Y, Mathis C, Berthelot JM, Charlier C, Prost A. Assessment of the efficacy of sacroiliac corticosteroid injections spondyloarthropathies: A double-blind study. *Br J Rheumatol* 1996; 35:767-770.
- 24) Sundman, EA, Cole, BJ, Karas, V, et al. The anti-inflammatory and matrix restorative mechanisms of platelet-rich plasma in osteoarthritis. *Am J SportsMed.* 2014;42(1):35-41.
- 25) Kabiri, A, Esfandiari, E, Esmaeili, A, Hashemibeni, B, Pourazar, A, Mardani, M. Plateletrich plasma application in chondrogenesis. *Adv Biomed Res.* 2014;3:138.
- 26) Foster TE, Puskas BL, Mandelbaum BR, Gerhardt MB, Rodeo SA. Platelet-rich plasma: from basic science to clinical applications. *Am J Sports Med.* 2009;37:2259- 2272.
- 27) Navani A, Gupta D. Role of intra-articular platelet-rich plasma in sacroiliac joint pain. *Tech Reg Anesth Pain Manage* 2015; 19:54-59.
- 28) Wallace P, Bezjian Wallace L, Tamura S, Prochnio K, Morgan K, Hemler D. Effectiveness of Ultrasound-Guided Platelet-Rich Plasma Injections in Relieving Sacroiliac Joint Dysfunction. *Am J Phys Med Rehabil.* 2020 Aug;99(8):689-693.
- 29) David G, Ciurea AV, Iencean SM, Mohan A. Angiogenesis in the degeneration of the lumbar intervertebral disc. *Journal of medicine and life.* 2010 May 15;3(2):154.
- 30) Kokar S, Kayhan Ö, Şencan S, Gündüz OH. The role of sacroiliac joint steroid injections in the treatment of axial spondyloarthritis. *Arch Rheumatol* 2021;36(1):80-88.
- 31) AndalibA, Etemadifar M, Ansari Bardei M. Evaluation of Intra articular corticosteroid injections in patients with sacroiliac pain. *Adv Biomed Res* 2022;11:13.
- 32) Plastaras CT, Joshi AB, Garvan C, Chimes GP, Smeal W, Rittenberg J, Lento P, Stanos S, Fitzgerald C. Adverse events associated with fluoroscopically guided sacroiliac joint injections. *PM R.* 2012 Jul;4(7):473-478.
- 33) Nagpal G, Flaherty JP, Benzon HT. Diskitis, Osteomyelitis, Spinal Epidural Abscess, Meningitis, and Endocarditis Following Sacroiliac Joint Injection for the Treatment of Low-Back Pain in a Patient on Therapy for

Hepatitis C Virus. Reg Anesth Pain Med. 2017 Jul-Aug;42(4):517-520.

- 34) Landi M, Maldonado-Ficco H, Perez-Alamino R, Maldonado-Cocco JA, Citera G, Arturi P, Sampaio-Barros PD, Flores Alvarado DE, Burgos-Vargas R, Santos E, Palleiro D, Gutiérrez MA, Vieyra-Sousa E, Pimentel-Santos F, Paira SO, Berman A, Barrezueta CV, Vazquez-Mellado J, Collantes-Estevez E; RESPONDIA Group. Fundación Reumatológica Argentina “Dr. Osvaldo García Morteo. Gender differences among patients with primary ankylosing spondylitis and spondylitis associated with psoriasis and inflammatory bowel disease in an iberoamerican spondyloarthritis cohort. Medicine (Baltimore). 2016 Dec;95(51):e5652.
- 35) Raj Singh, Sushil Kumar Upadhyay, Hardeep Singh Tuli, Manoj Singh, Vikas Kumar, Mukesh Yadav, Diwakar Aggarwal, Sunil Kumar. “Ethnobotany and Herbal Medicine: Some Local Plants with Anticancer Activity.” Bulletin of Pure and Applied Sciences, Section B – Botany, 2020; 39B(1):57–64.
- 36) Ko GD, Mindra S, Lawson GE, Whitmore S, Arseneau L. Case series of ultrasound-guided platelet-rich plasma injections for sacroiliac joint dysfunction. J Back Musculoskelet Rehabil. 2017;30(2):363-370.
- 37) Singla V, Batra YK, Bharti N, Goni VG, Marwaha N. Steroid vs. Platelet-Rich Plasma in Ultrasound Guided Sacroiliac Joint Injection for Chronic Low Back Pain. Pain Pract. 2017 Jul;17(6):782-791.

Figure 1: Distribution of Age

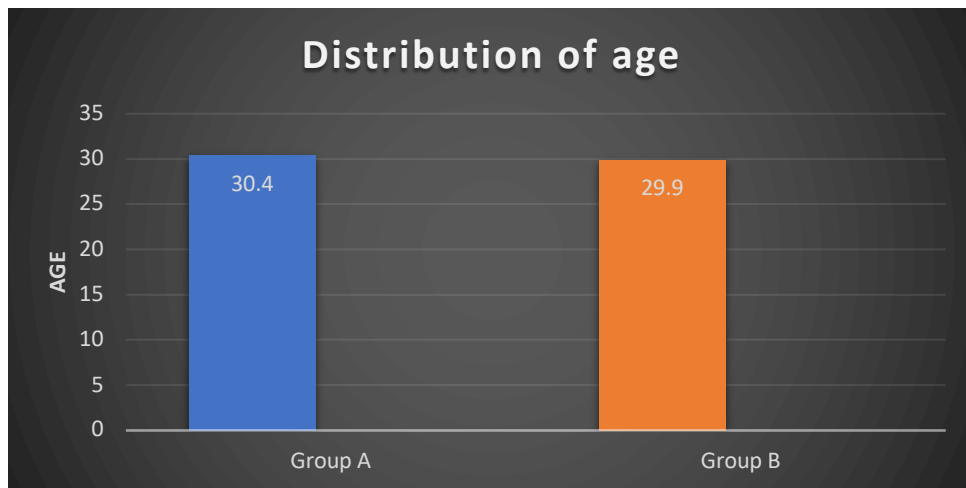


Figure 2: Distribution of Gender

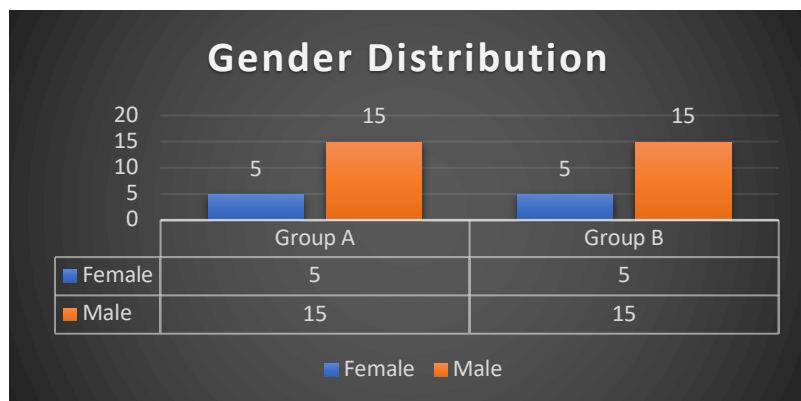


Table 1: Bmi Distribution

Group		Mean	Std. Deviation	P-value
BMI	Group A	23.44	1.06	0.742
	Group B	23.33	0.94	

Figure 3: Comparision of Nprs in Both Groups

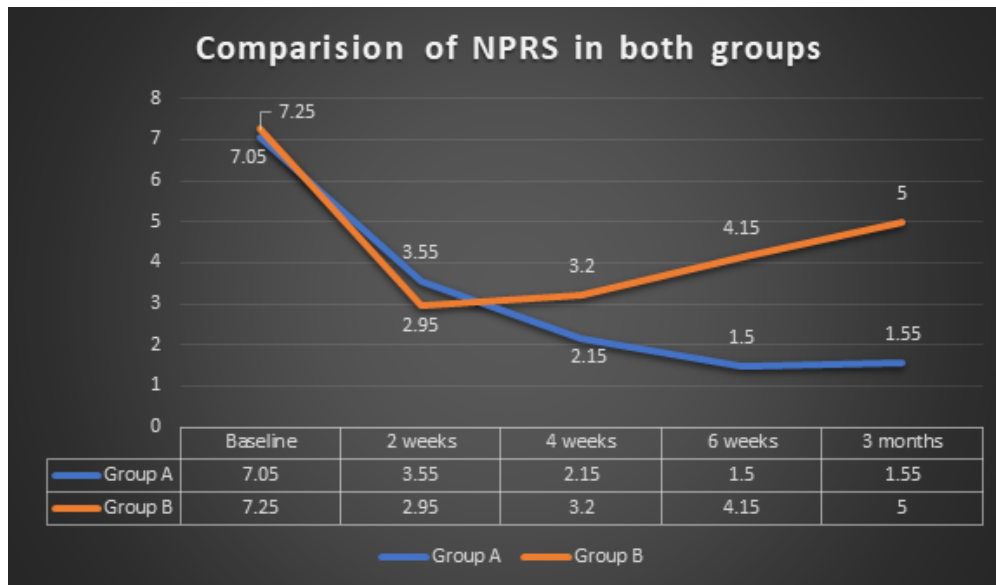


Figure 4: Comparision Of 50% Reduction of Nprs from Baseline

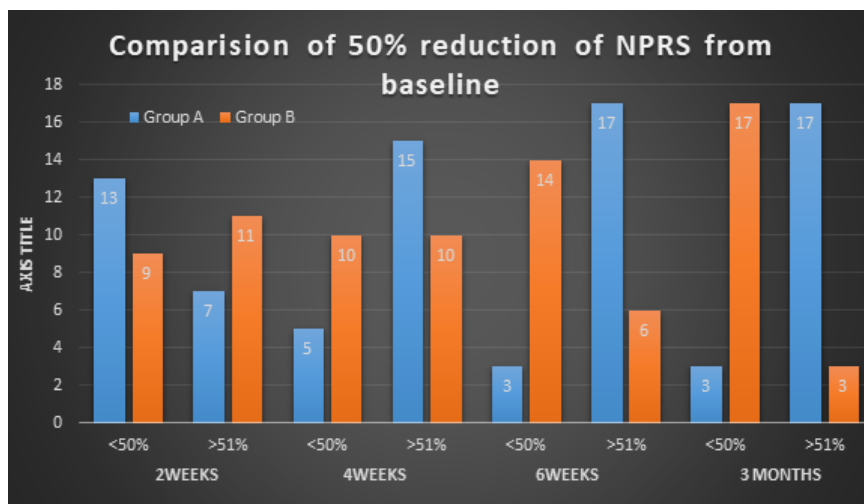


Figure 5: Comparision of Odi in Both Groups

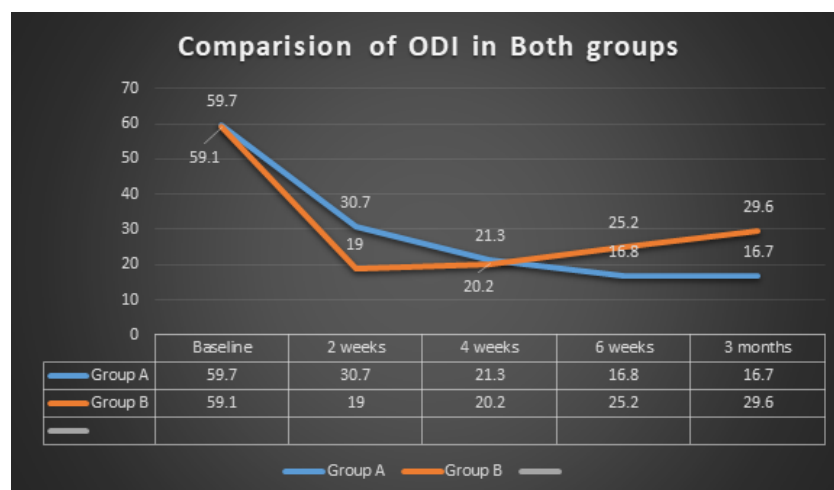


Figure 6: Outcome of Odi at 3 Months

