# Facet and Selective Nerve Root Blocks as a Diagnostic and Therapeutic Alternative in Patients with Chronic Low Back Pain

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## ABSTRACT

**Introduction:** Intra-articular facet blocks and selective nerve root blocks are useful as a diagnostic and therapeutic method for the management of chronic low back pain. The objective of this study was to describe and analyze the results of these blocks. **Materials and Methods:** A retrospective cohort study was conducted with data from patients undergoing CT-guided intra-articular facet block and selective nerve root block between January 2014 and February 2015. The demographic information, the visual analog scale's score before and after the block, and their relationships to the outcomes were analyzed. **Results:** The study included 68 patients with intra-articular facet block and 89 with selective nerve root block. In both groups, pain improved significantly ($p < 0.05$). There was an association between the improvement in pain with intra-articular facet blocks and gender and age, and between the improvement achieved by selective nerve root blocks and the type of initial pain. **Conclusions:** Intra-articular facet blocks and selective nerve root blocks are a useful diagnostic method in the management of chronic low back pain and their therapeutic action is significant, although studies are needed to know their analgesic effect in the medium and long term, in order to improve the quality of life of patients.
**Keywords:** Low back pain; facet block; selective nerve root block; computed tomography; radioscopy.
**Level of Evidence:** IV

### Bloqueos facetarios y radiculares selectivos como alternativa diagnóstica y terapéutica en pacientes con dolor lumbar crónico

## RESUMEN

**Introducción:** Los bloqueos facetarios intrarticulares y radiculares selectivos son útiles como método diagnóstico y terapéutico para el manejo del dolor lumbar crónico. El objetivo de este estudio fue describir y analizar los resultados de dichos bloqueos. **Materiales y Métodos:** Se realizó un estudio de cohorte retrospectivo con datos de pacientes sometidos a bloqueos facetarios intrarticulares y radiculares selectivos guiados por tomografía computarizada, entre enero de 2014 y febrero de 2015. Se analizaron los datos demográficos, el puntaje en la escala analógica visual antes del bloqueo y después, y se analizó la asociación de estos factores con los resultados. **Resultados:** El estudio incluyó a 68 pacientes con bloqueo facetario intrarticular y 89 con bloqueo radicular selectivo. En ambos grupos, el dolor mejoró significativamente ($p < 0,05$). Hubo una asociación entre la mejoría del dolor con los bloqueos facetarios intrarticulares y el sexo y la edad, y entre la mejoría lograda por los bloqueos radiculares selectivos y el tipo de dolor inicial. **Conclusiones:** Los bloqueos facetarios intrarticulares y los bloqueos radiculares selectivos son un método diagnóstico útil en el manejo del dolor lumbar crónico y su acción terapéutica es significativa, aunque hacen falta estudios para conocer su efecto analgésico a mediano y largo plazo, y así poder mejorar la calidad de vida de los pacientes.
**Palabras clave:** Lumbalgia; bloqueo facetario; bloqueo radicular selectivo; tomografía computarizada; radioscopia.
**Nivel de Evidencia:** IV

## INTRODUCTION

Low back pain is considered one of the main reasons for consultation in emergency services and general and specialized medical consultation; it is presumed that two-thirds of adults will experience an episode of low back pain in their lifetime.[1] For this reason, it continues to be an entity that requires a great economic demand and an important use of health resources for health systems.[2]

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The causes of chronic low back pain are mainly mechanical and are related to degenerative facet and disc disease.[3] The facets are innervated by the medial branches of the posterior rami of the spinal nerves, which provide sensory innervation. Capsular distension due to inflammation of these joints stimulates the nociceptive endings and causes low back pain.[4] On the other hand, disc disease can generate mechanical compression of the nerve roots, triggering an inflammatory cascade that affects the transmission of the spinal nerves and, in this way, causes pain with a dermatomeric pattern (radicular pain).[5]

The precise diagnosis of the etiology of low back pain is often inconclusive, and neither clinical evaluation nor complementary studies are sufficient to reach the diagnosis. In turn, the treatment of this condition is still under discussion, and there are numerous articles with variable evidence that propose different alternatives.[6]

Intra-articular facet blocks (IFB) and selective nerve root blocks (SNRB) have the primary goal of confirming the etiology of pain and, as a secondary goal, alleviating or eliminating pain caused by the structures to be injected. The indications for both blocks are not comparable.

The objective of this study was to describe and analyze the outcomes of IFB and SNRB in the diagnosis and treatment of low back and radicular pain, and to analyze possible factors that influence these outcomes.

## MATERIALS AND METHODS

A retrospective cohort study was conducted with data from patients who underwent IFB and SNRB guided by computed tomography between January 2014 and February 2015.

Patients with chronic low back pain (>12 weeks) of mechanical origin unresponsive to analgesics and who underwent computed tomography-guided percutaneous blocks were included. An IFB was used in patients who had non-radiating pain, symptoms that worsened with spine extension, and images suggestive of degenerative facet disease (joint space narrowing, osteophytes, subchondral cysts, facet hydrarthrosis); SNRBs were used in patients who had radicular pain, and magnetic resonance imaging of foraminal or extraforaminal hernia that coincided with clinical signs.

Patients with other causes of low back pain and a history of spinal surgery were excluded.

All were subjected to the same block technique described below; the choice of the type of block was determined by the complementary studies.

### Technique for blocking

The technique for the blocks is performed with the patient in the prone position, on the CT scan table. First, a bone scan is taken and the area to be blocked is identified (articular facet in the IFB and foramen in the SNRB) in the axial slices. The distance on the skin surface from the midline to the area to be blocked (facet or corresponding foramen) and the distance from this point in depth to the area to be blocked are measured. Skin antisepsis is carried out. Skin anesthesia is administered to the entry site with 2% lidocaine. Then, pencil-point needles for spinal anesthesia (25 or 27G in diameter) are placed, following the orientation and previous measurements. Tomographic control is carried out to confirm the location and, if necessary, rearrange the needles. 1 ml of the anesthetic agent (2% lidocaine) and 1 ml of depot corticosteroids (6 mg/ml betamethasone acetate + 7.8 mg/ml betamethasone sodium phosphate) are instilled. Finally the needle is withdrawn and the entry point is covered after applying the antiseptic.

### Variables and statistical analysis

The patients were divided according to the intervention: IFB group and SNRB group. Demographic data such as gender, age (≤45 years and >45 years), and comorbidities were recorded. The injected site and whether the block was unilateral or bilateral were also taken into account.

The visual analog scale (VAS) score for pain was recorded before the block and a second record was obtained after the procedure, before the patient left the institution (we told them to stay in the institution 20-40 min to monitor adverse effects). A decrease in the initial VAS score was considered a positive outcome, and a decrease of 5 points or more in that value was considered a significant improvement.

Firstly, the results of the blocks were analyzed by evaluating the VAS score before and after, and observing if there was a significant decrease in pain using the Student's t-test for related variables. Then, the association between the significant improvement in pain and the sex and age of the patients was analyzed using the chi-square test, as well as whether the initial VAS score (disabling pain with scores ≥8, and non-invalidating with values <8) influenced the results. For the analysis of the variables, the IBM SPSS Static 26.0® program was used.

## RESULTS

A total of 157 patients were included, 68 with IFB (69.4% were >45 years) and 89 with SNRB (82% >45 years) (Figure 1).

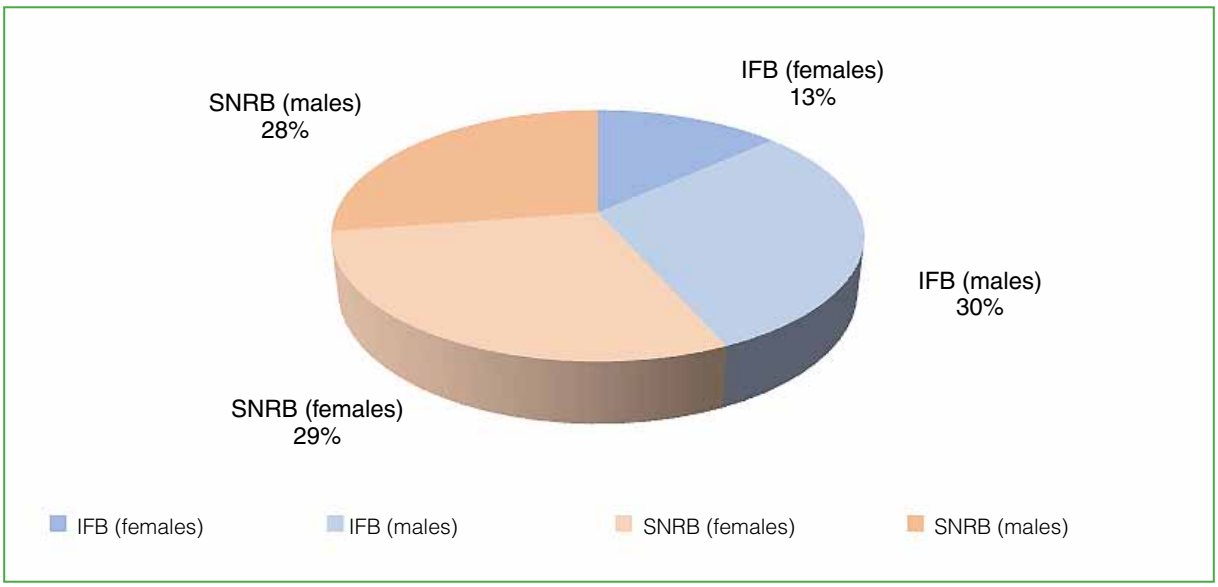


**Figure 1.** Distribution of patients according to the intervention (intra-articular facet block and selective nerve root block) and sex.

The most frequent intervention sites were segments L5-S1 (52.9%) and L4-L5 (39.7%), followed by L2-L3 (4.4%) and L3-L4 (2.9%) in the IFB group (8 unilateral and 60 bilateral) and segments L5-S1 (41.5%), L4-L5 (39.3%), followed by L3-L4 (13.5%), L2-L3 (3.3%) and L1-L2 (2.2%) in the SNRB group (83 unilateral and 6 bilateral).

With respect to the IFB data analysis, the average VAS score was 8.14 before the block and 3.39 after. In 91% of the patients in the group (61 individuals), the initial score decreased and 65.5% of them (40 patients) had a statistically significant improvement ($p < 0.05$) (Figure 2). A relationship was found between the improvement in pain and the variables sex and age (the results were better in the group >45 years and in the female sex).

Mean VAS scores in the SNRB group were similar: 8.15 before the procedure and 3.68 after it. 87% (79 patients) obtained scores lower than the initial ones and, of these, 69.6% (55 patients) had a significant improvement (Figure 2). This initial pain improvement was also statistically significant ($p < 0.05$). Unlike the previous group, there was an association between the initial VAS score and the improvement after the block (patients with initial disabling pain obtained better results). However, no statistically significant relationship was found between the improvement in pain and the variables of sex and age.

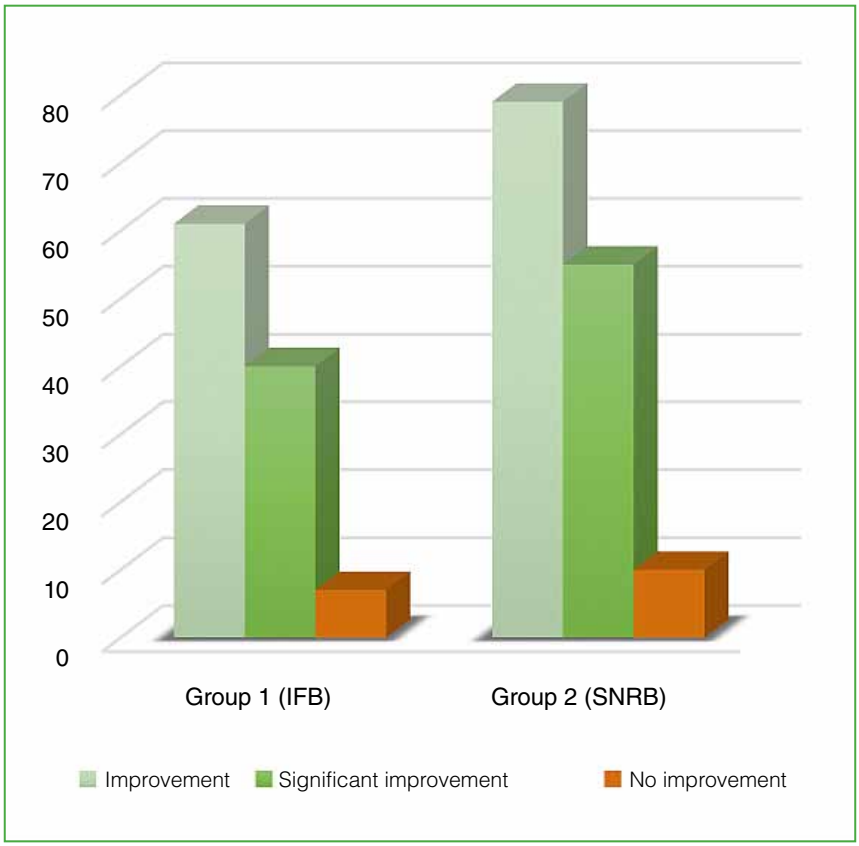


**Figure 2.** Operated patients with favorable outcomes (pain improvement or significant improvement) and unfavorable outcomes (no pain improvement).

## DISCUSSION

Low back pain usually manifests as acute pain lasting <4 weeks, subacute pain lasting 4 to 12 weeks, and chronic pain lasting more than 12 weeks.[7] Traditionally, it was accepted that the episodes were brief; however, this notion has been called into question as a high number of patients experience recurrences. It is estimated that low back pain can persist for a year or more after the first episode in 35-60% of patients,[8] therefore, in these cases, it is important to identify the cause of the pain in order to administer targeted treatment.

Facet blocks work by injecting an anesthetic agent and corticosteroids into the facet joint to relieve pain, whereas radicular blocks work by injecting drugs into the nerve root to lessen inflammation and hence the intensity of radicular pain.[9,10] The main objective is to diagnose the anatomical cause of pain and identify the area to be operated on. The secondary goal is to provide analgesia and a better quality of life to patients who are not candidates for surgical treatment, reducing the use of analgesics and maintaining work activities.[5,11] Traditionally, blocks were performed using anatomical repairs or were guided by fluoroscopy, but with computed tomography, not only is the required level correctly obtained, but essential structures are also avoided due to improved vision and precision.[12] In our study, all patients underwent CT-guided percutaneous blocks. In 91% of the patients with IFB and 87% with SNRB, the symptoms improved, so it is assumed that said inoculated structure was the one causing the low back pain. In turn, 65.6% and 69.6%, respectively, had a significant improvement in pain, so an analgesic effect was also obtained.

Regarding the results that have been published, in a prospective study of 76 patients, Kanaan et al.[13] reported that surgical treatment could be avoided in 54% of patients undergoing SNRB, and that pain was relieved in the long term in 29% of them. On the other hand, in their systematic review of 108 articles, Viswanathan et al.[14] conclude that SNRB obtains good outcomes in 78-88% of patients, and there are factors that influence these outcomes, such as the duration and severity of symptoms, or imaging factors such as osteoporosis, location, size and type of disc disease.

Regarding IFBs, in a systematic review by Cohen et al.,[15] it is pointed out that, despite the fact that some articles do not confirm the efficacy of intra-articular injections with corticosteroids, others report that said intervention can alleviate pain, at least in the first three months, in 75% of patients. In a retrospective study with 323 patients, Ospina et al.[16] found symptomatic improvement in 78% of patients and considered IFBs an effective diagnostic and therapeutic method.

In our research, we obtained a significant sample and were able to affirm our main study hypothesis, confirming that the blocks are a useful diagnostic tool and, in some cases, have therapeutic action. In turn, it was possible to analyze the different factors that influence the results, such as the sex, age and intensity of pain of the patients. We believe that prospective studies with medium- and long-term analyses are still needed, but this research opens the way to new questions oriented mainly to the selection of patients to be operated on.

## CONCLUSION

The IFBs and the SNRBs were useful diagnostic methods in the management of chronic low back pain and had a significant therapeutic action in the short term, although studies are needed to determine their analgesic action in the medium and long term and thus be able to achieve an improvement in the quality of life of these patients.

Conflict of interest: The authors declare no conflicts of interest.

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