



ISSN : 2350-0743



RESEARCH ARTICLE

CROSSREF

OPEN ACCESS

TREATMENT OF GONALGIA PREDOMINANTLY OF DEGENERATIVE ORIGIN WITH MANUAL THERAPY AND MYOFIBROLYSIS: A CASE SERIES REPORT

Sante Orzes^{1,†}, Raffaele Tendi^{2,‡}, Roberto Centemeri³ and Jari Intra^{4,*}

¹D'Annunzio University of Chieti–Pescara, Italy, ²Ontario Association of Osteopathic Practitioners, Canada; ³School of Medicine and Surgery, University of Milano-Bicocca, and Unit of Occupational Health, Fondazione IRCCS San Gerardo dei Tintori, Monza, Italy; ⁴Clinical Chemistry Laboratory, Fondazione IRCCS San Gerardo dei Tintori, Monza, Italy

ARTICLE INFO

Article History

Received 14th July, 2025
 Received in revised form
 18th August, 2025
 Accepted 24th September, 2025
 Published online 28th October, 2025

Keywords:

Gonalgia; Manual Therapy;
 Myofibrolysis; Posturology; Knee.

*Corresponding author: Jari Intra

ABSTRACT

Background: This retrospective study was conducted between 2017 and 2023 on 84 patients affected by gonalgia, which was clinically and radiologically documented. **Objective:** The aim was to assess the efficacy of manual therapy and myofibrolysis. **Methods:** Patients were assessed clinically and through radiographs, and range of motion (ROM) that was measured using a goniometer and pain level assessed via the VAS scale, both at baseline, 1-2, 3-8, and up to 10 months to 6 years' post-treatment, were determined. **Results:** The patients enrolled (19 males, 65 females) aged between 16 and 90 years (mean age 65.8 years). Knee pain was more prevalent on the right side in 50 subjects while on the left in 34. The average number of treatments was 3.1 (ranging from 1 to 6). Radiological severity, according to the Kellgren-Laurence classification, ranged from 0 to 4. The average initial ROM was -31.3° (ranging from 0 to -60°), improving to -13.9° at 1-2 months, -10.1° at 3-8 months, and -8.5° at 10 months to 6 years. VAS score was 5.7 (ranging from 4 to 10), with significant reductions at 1-2 months (VAS mean 3), 3-8 months (VAS mean 2.1), and 10 months to 6 years (VAS mean 1.8). **Conclusion:** The results suggested that manual therapy combined with myofibrolysis can have a positive impact on improving ROM and reducing pain (VAS). This approach may also reduce the need for additional treatments, slow disease progression, and, in some cases, delay or avoid the need for joint replacement.

Copyright©2025, Sante Orzes et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Sante Orzes, Raffaele Tendi, Roberto Centemeri and Jari Intra, 2025. "Treatment of Gonalgia Predominantly of Degenerative Origin with Manual Therapy and Myofibrolysis: a case series report", International Journal of Recent Advances in Multidisciplinary Research, 12, (10), 11784-11788.

INTRODUCTION

Gonalgia, also known as knee pain, of predominantly degenerative origin is a common problem both in sportsman and in non-sportsman. Knee degeneration, although affecting various structures, is almost a constant pathology, albeit with different intensity and type, especially after the fifth or sixth decade of life (Sanchis-Alfonso et al., 1999; Boling et al., 2010; Hunter et al., 2022). Various treatment approaches can be employed other than joint replacement: medical (nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroids), infiltrative (anesthetics, corticosteroids, hyaluronic acid, ozone therapy, leukocyte-platelet extracts, collagen, stem cells), physical instrumental (magnetotherapy, laser, ultrasound, tecartherapy, shockwaves, Transcutaneous Electrical Nerve Stimulator (TENS)), kinesitherapy (joint mobilization, muscle strengthening and rebalancing, stretching), massage therapy (particularly connective tissue), and sports therapy (cycling, weight training) (French et al., 2011; Demirici et al., 2017; Altinbilek et al., 2018; Anwer et al., 2018; Dunning et al., 2018; Cashin and McAuley, 2020; Choudary et al., 2022; Zhou et al., 2022; Nayab and Bilal Elahi, 2024). For 44 years, we have used manual therapy with

modest to good results, while in the last 13 years, we have introduced myofibrolysis, and the clinical outcomes generally have improved more rapidly. This study was conducted to assess the efficacy of these treatments in this pathology, which is not always easy to alleviate or slowdown in its progression.

MATERIALS AND METHODS

Patients and study design: This study was conducted at private clinics in the provinces of Belluno, Vicenza, and Padua from 2017 to 2023. A total of 84 outpatients (19 males, 65 females) suffering from gonalgia were enrolled. All patients had documented imaging (X-rays, CT scans, MRIs, etc.), and most of them had previously undergone multiple specialist assessments (orthopedic, rheumatologic, physiatrist, etc.). All patients exhibited significant joint restriction, typically associated with pain when forced movement occurred in one or more directions. Inclusion Criteria: Gonalgia documented through radiological and clinical evaluations. Exclusion Criteria: Patients who had undergone infiltrative or manual therapy at other centers or those who underwent surgery during the evaluation period. We observed that the most

commonly compromised and indicative direction of movement is the end of knee flexion, which is limited and painful if forced (usually associated with restriction of other, lesser movements). The limitation of range of motion (ROM) during knee flexion (blockage, pain) was assessed with a goniometer. We considered a normal flexion to be 140°, although we believe the knee should flex freely and painlessly. Radiological evaluations (X-rays, CT scans, MRIs) were conducted using the Kellgren-Lawrence scale (0 to 4). The average pain intensity was assessed using the Visual Analog Scale (VAS) before treatment, at 1-2 months, 3-8 months, and 10 months to 5 years after treatment (although it is debatable to rely solely on this scale). We also collected demographic factors such as age, gender, laterality, and number of treatments. Some patients, particularly due to economic reasons, only attended three follow-up sessions after initial treatments, where ROM and VAS were reassessed, and new examinations were performed if necessary. These follow-ups typically included a rapid, local manual treatment, but not myofibrolysis.

Manual therapy: A trigger-tender point, contracture, or myofascial fibrosis can independently restrict one or more directions of movement and result in a limitation of both passive and/or active range of motion (ROM) in one or more joints. These dysfunctions remain undetected through conventional imaging methods such as X-ray, CT scans, or MRI, and therefore not treated. However, they have significant pathophysiological and therapeutic implications. Improvement of these commonly corresponds with a marked and sustained enhancement of local physiological function (French *et al.*, 2011; Demirici *et al.*, 2017; Altinbilek *et al.*, 2018; Anwer *et al.*, 2018). Our primary techniques to treat these conditions were massage and myofibrolysis. We used various tools including:

- Rotating instruments of different shapes and sizes, aimed at inducing hyperemia, promoting catabolite drainage, enhancing metabolite delivery, stimulating reflexogenic effects, and mechanically disrupting altered myofascial areas;
- Probes and tips of various structures and dimensions, used to stimulate hyperemia, mobilize adhered tissues, and specifically target and deconstruct dysfunctional altered myofascial areas;
- Cupping devices of different types, employed to induce hyperemia, facilitate tissue detachment, and achieve both hemodynamic and reflexogenic effects;
- Hooks of varying sizes and forms, used for tissue mobilization, and to act on muscles, fasciae, ligaments, altered myofascial areas, and scar tissue.

During treatment, the target muscle is generally placed under a submaximal stretch to optimize therapeutic effects.

Statistical analysis: Statistical analyses were carried out using MedCalc for Windows, version 19.4 (MedCalc Software, Ostend, Belgium). The chi-square (χ^2) test was used to compare the results obtained in the different groups. A p value < 0.05 was considered statistically significant.

Institutional review board (IRB) statement: The Institutional review board waive the requirement for informed consent because all subjects' data were de-identified.

RESULTS

A total of 84 subjects (19 males, 65 females) were examined and treated, with ages ranging from 16 to 90 years, and a mean age of 65.8 years (66 years for males, 65.7 years for females). Fifty patients presented with right knee pathology, and 34 with left knee pathology (Table 1). The average number of treatment sessions was 3.1 (ranging from 1 to 6 sessions). Radiological severity distribution, following the Kellgren-Lawrence scale, was: (I) level 0, 4 cases; (II) level 1, 18 cases; (III) level 2, 26 cases; (IV) level 3, 13 cases; (V) level 4, 23 cases.

Table 1. Baseline characteristics of subjects enrolled in this study

	Males (n)	Females (n)
Subjects (n = 84)	19	65
Meanage (years)	66	65.7
Kneepathology	Right: n =50	Left: n =34

The results obtained after treatment sessions were:

Range of Motion (ROM):

- Initial average ROM: -31.3° (ranging from 0° to -60°).
- ROM at 1-2 months: -13.9° (ranging from 0° to -55°).
- ROM at 3-8 months: -10.1° (ranging from 0° to -55°).
- ROM at 10 months to 6 years: -8.5° (ranging from 0° to -55°).

Visual Analog Scale (VAS) for Pain:

- Initial VAS average: 5.7 (ranging from 4 to 10).
- VAS at 1-2 months: 3 (ranging from 0 to 7).
- VAS at 3-8 months: 2.1 (ranging from 0 to 7).
- VAS at 10 months to 6 years: 1.8 (ranging from 0 to 5).

The differences of the results obtained in the groups of the two variables considered, ROM and VAS, were statistically significant (p-value < 0.001) (Table 2). It is important to note that in more than one-third of the cases, before the manual therapy treatments, knee replacement was proposed, and most of them had also been advised to undergo meniscectomy, shaving, or other procedures.

DISCUSSION

We observed that between the clinical and radiological onset of the pathology and the potential intervention (usually knee replacement), there is an opportunity that can be done in terms of prevention or treatment. If the radiological findings and joint restriction are severe, the results tend to be more partial, although significant benefits can still be achieved even in "severe" cases. It is important to emphasize that improvements in ROM are generally associated with improvements in VAS scores. The improvement in ROM, which we believe is primarily due to the relaxation of muscular, ligamentous, and capsular structures, likely has a significant impact on the disease's progression. This is because the pressure becomes less concentrated on specific points per unit of surface area, which may reduce the tendency toward cartilage degeneration.

Table 2. Variation of ROM and VAS during time study

Variable	Time 0	Time 1 (after 1-2 months)	Time 2 (after 3-8 months)	Time 3 (after 10 months to 6 years)	p-value*
Range of motion (ROM)	-31.3° (ranging from 0° to -60°)	-13.9° (ranging from 0° to -55°).	-10.1° (ranging from 0° to -55°).	-8.5° (ranging from 0° to 55°).	< 0.001
Visual Analog Scale (VAS) for Pain	5.7 (ranging from 4 to 10).	3 (ranging from 0 to 7).	2.1 (ranging from 0 to 7).	1.8 (ranging from 0 to 5).	< 0.001

*A p value < 0.05 was considered statistically significant

reported by French and coauthors, who concluded that manual therapy can lead to short-term improvements in pain, stiffness, and function in patients with hip and knee osteoarthritis. Although variability among studies was noted, the review supports our data underlining how therapeutic techniques, particularly those targeting soft tissues and joint mobility, have a substantial role in conservative osteoarthritis care (French *et al.*, 2011). More recently, in a systematic review and meta-analysis, Runge and coauthors confirmed that adding manual therapy to exercise therapy resulted in statistically significant improvements in both pain reduction and functional capacity for patients with knee and hip osteoarthritis. The manual therapy has a synergistic effect when combined with exercise interventions, reinforcing the idea that biomechanical restoration through hands-on techniques not only improves symptoms but also enhances function (Runge *et al.*, 2022). Additionally, Tsokanos and coauthors reported evidence on the use of manual therapy in patients with knee osteoarthritis and concluded that manual therapy provides clinically relevant benefits, particularly in improving pain, range of motion, and physical function. The review highlighted a range of manual techniques—mobilizations, manipulations, soft tissue techniques—and reported that even short-term applications had measurable effects (Tsokanos *et al.*, 2021). Their findings are aligned with our clinical experience, especially regarding the importance of joint-specific mobilization techniques (e.g., tibiofemoral and patellofemoral mobilizations) and soft tissue work on structures such as the quadriceps and pes anserinus.

Moreover, the Cochrane review by Hurley and coauthors highlighted not only the importance of exercise in osteoarthritis management but also the critical role of patient engagement and expectations in treatment outcomes. It has been observed that when manual therapy leads to immediate improvements in pain and mobility, patients become more confident in their ability to move, which enhances their enthusiasm to engage in rehabilitative exercise and movement-based therapies. This alignment is a key component in successful long-term management (Hurley *et al.*, 2018). Notably, the relatively low number of treatment sessions still proves to be quite effective. While it is difficult to completely eliminate pain, especially in advanced cases, we often manage to alleviate symptoms and improve patient autonomy and quality of life. In many cases, surgical intervention can be postponed or even avoided. Here, we focused primarily on the importance of myofibrosis. We have been practicing manual therapy, osteopathy, chiropractic, acupuncture, reflexology, posturology for 44 years in treating this pathology, with modest to good results. Myofibrosis provides an additional benefit compared to prior treatments and should be included in the routine. Special attention should be given to the distal quadriceps, particularly the vastusmedialis, pes anserinus, semitendinosus, biceps femoris, etc.

in Knee Flexion: Restriction in knee flexion is often the most significant limitation observed in knee pain and is commonly associated with conditions like gonarthrosis. The restriction in flexion, especially when forced, often correlates with increased pain (measured by VAS). If manual therapy can free up this motion, there is usually a significant improvement in the ROM and a decrease in pain levels. Role of Manual Therapy: Manual therapies, especially myofibrosis, can release muscular, ligamentous, capsular tension in the tibiofemoral, tibiofibular, patella-femoral area and restore normal motion at the knee. Treatment of the superior tibiofibular joint (and surrounding structures) can have immediate positive effects on knee mobility and reduce pain. This is especially true in cases where the pain is localized laterally, but sometimes even medially, because the mechanical dysfunction may originate from the tibiofibular joint or related structures (e.g. the popliteus muscle), as previously reported by Tsokanos and coauthors which underlined the key role of manual therapy techniques in improving joint function and reducing pain in knee osteoarthritis (Tsokanos *et al.*, 2021).

Importance of Popliteus and Peroneal Head: The popliteus muscle plays a significant role in controlling knee flexion and rotation. An irritated popliteus or trigger points at this level can significantly reduce knee function. Similarly, the head of the peroneus, often positioned incorrectly due to muscular restrictions, can inhibit the normal mechanical motion of the knee. This can create further dysfunction, especially in knee flexion at the end of its range.

It is essential to consider the interconnections between the foot, ankle, tibiofibular joint, and knee. Treating these areas with techniques like manual therapy, myofibrosis, and focusing on the mechanical interactions of muscles such as the popliteus and the peroneal head can significantly improve knee function, discharge pain, and increase mobility.

Trigger Points (TP) and Fibrosis in the Quadriceps:

Trigger Points in Quadriceps Muscles (Especially VastusMedialis):

a.Importance: TP in muscles like the vastusmedialis (part of the quadriceps) are often overlooked but play a significant role in knee pathology. These points of fibrosis and muscle tension can cause significant pain and dysfunction, which, if not addressed, can worsen the condition over time.

Hypothesis: When the tibia moves into flexion, these structures (quadriceps, especially vastusmedialis) are stretched. The tension (painful stretching) causes the movement to halt as the body attempts to avoid further

discomfort. This lack of coordination can lead to compression of the menisci, like a "nutcracker," causing meniscal degeneration, tears, or worsening of pre-existing conditions.

Zampad'Oca (Goose's Foot) and Other Muscles Involved

Muscles Affected: Sartorius, gracilis, semitendinosus, and sometimes the biceps femoris and semimembranosus.

Role in Knee Pathology: These muscles, if affected by TP, can significantly impact knee function and should be addressed before focusing on muscle toning or more invasive treatments (e.g., injections). The "zampad'oca" is crucial for controlling knee mechanics and any dysfunction here can affect overall knee stability and movement.

Fluent Articular Surfaces:

Friction and Resistance: Proper joint movement depends on the smooth gliding of the articular surfaces. Any friction, misalignment, or resistance—such as that caused by meniscopathies, chondropathies, or degenerations—can hinder fluid motion and lead to pain.

Impact of Muscle Tension: Ipertonia (muscle hypertonia) and incorrect muscle pressure contribute to impaired joint function. When muscles don't work harmoniously (e.g., uneven activation or excessive tension), it increases the stress on joints, leading to further damage, particularly in conditions like gonarthrosis.

Restoring Gliding Movement: Restoring smooth gliding movements (e.g., anterior-posterior, internal-external rotation, abduction-adduction) through manual therapy or specific exercises can improve the fluidity of movement and often provide significant, lasting relief from symptoms.

Unclear Pathophysiology:

Hypotheses: While the exact mechanisms causing improvements in knee function are not entirely clear, the proposed ideas include the alleviation of muscle tension, restoring fluid motion, and addressing trigger points. Even in more severe cases, particularly those with significant radiological findings, manual therapy has been shown to lead to dramatic and immediate improvements in both function and pain levels. This work presents some limitations that should be considered: no standardized scales (such as WOMAC, KSS, etc.) were used, the study was not conducted in a double-blind manner, and the ROM was assessed with potential margins of error (although we made efforts to be as precise as possible). Nonetheless, we present the case series here, as there is little literature available on the topic. We hope that more rigorous studies will be conducted in the future.

CONCLUSION

- **Biodynamics of the Area:** Maintaining or restoring the normal length, tension, and mechanics of the muscles, ligaments, capsule, and joint surfaces is essential for optimal knee function. This helps ensure the correct distribution of forces across the joint, preventing localized overload that can lead to pain and further damage.

- **Reducing Abnormal Load:** By addressing abnormal muscle tone (especially through trigger point release), the pathologically increased tension that contributes to uneven loading of the joint is alleviated. This helps reduce the compression forces exerted on the articular cartilage, a key factor in the development of degenerative changes like osteoarthritis.
- **The Role of the Spine and Nervous System:** The health of the dorsal-lumbar-sacral spine is also critical. Nerves originating from this region govern muscle contraction, sensation, blood supply, and many other physiological processes. If these nerve signals are impaired, they can contribute to musculoskeletal dysfunction, affecting not just the knee but the entire body. Restoring proper spinal function is crucial in preventing dystrophic alterations and other dysfunctions at all levels.

Take home messages:

- Trigger points and muscle fibrosis, especially in key muscles like the quadriceps, zampad'oca, and hamstrings, are often overlooked but can significantly impact knee function and pain.
- Addressing these issues early, especially through manual therapy techniques such as myofibrolysis, is essential for long-term relief and improvement.
- Restoring smooth joint mechanics and the fluidity of articular surfaces is fundamental to alleviating pain and improving knee function.
- The overall health of the spine and nervous system must also be considered, as dysfunction in these areas can exacerbate knee problems and lead to widespread musculoskeletal and systemic issues.

Author Contributions: Conceptualization, S.O., R.T. and R.C.; methodology, S.O. and R.T.; data curation, R.C. and J.I.; writing original draft preparation, S.O. and R.T.; writing, review and editing, R.C. and J.I.; supervision, S.O., R.T., R.C. and J.I. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Informed Consent Statement: The local ethics committee did not require informed consent because all subjects' data were de-identified.

ACKNOWLEDGMENTS

We are grateful to Dr. Elena Intra for reviewing the manuscript.

Conflicts of Interest: The authors declare no conflict of interest

REFERENCES

- Altınbilek, T., Murat, S., Yumuşakhuylu, Y., İçağasıoğlu, A. 2018. "Osteopathic manipulative treatment improves function and relieves pain in knee osteoarthritis: A single-blind, randomized-controlled trial." *Turkish Journal of Physical Medicine and Rehabilitation* 9;64(2):114-120.

- Anwer, S., Alghadir, A., Zafar, H., Brismée, J.M. 2018. "Effects of orthopaedic manual therapy in knee osteoarthritis: a systematic review and meta-analysis." *Physiotherapy* 104(3):264-276.
- Boling, M., Padua, D., Marshall, S., et al. 2010. "Gender differences in the incidence and prevalence of patellofemoral pain syndrome." *Scandinavian Journal of Medicine & Science in Sports* 20(5):725-30.
- Cashin, A.G., McAuley, J.H. 2020. "Clinimetrics: Physiotherapy Evidence Database (PEDro) Scale." *Journal of Physiotherapy* 66(1):59.
- Choudhary, K., Khanna, A., Awasthi, S., Padung, M. 2022. "Comparison between the effects of Maitland's mobilization versus its combination with vastusmedialis oblique neuromuscular stimulation on two scales (NPRS & WOMAC) in knee osteoarthritis patients." *Indian Journal of Medical Research* 156(1):149-154.
- Demirci, S., Kinikli, G.I., Callaghan, M.J., Tunay, V.B. 2017. "Comparison of short-term effects of mobilization with movement and Kinesiotaping on pain, function and balance in patellofemoral pain." *Acta Orthopaedica et Traumatologica Turcica* 51(6):442-447.
- Dunning, J., Butts, R., Young, I., et al. 2018. "Periosteal Electrical Dry Needling as an Adjunct to Exercise and Manual Therapy for Knee Osteoarthritis: A Multicenter Randomized Clinical Trial." *Clinical Journal of Pain* 34(12):1149-1158.
- French, H.P., Brennan, A., White, B., Cusack, T. 2011. "Manual therapy for osteoarthritis of the hip or knee - a systematic review." *Manual Therapy* 16(2):109-17.
- Hunter, C.W., Deer, T.R., Jones, M.R., et al. 2022. "Consensus Guidelines on Interventional Therapies for Knee Pain (STEP Guidelines) from the American Society of Pain and Neuroscience." *Journal of Pain Research* 15:2683-2745.
- Hurley, M., Dickson, K., Hallett, R., et al. 2018. "Exercise interventions and patient beliefs for people with hip, knee or hip and knee osteoarthritis: a mixed methods review." *Cochrane Database of Systematic Reviews* 4(4):CD010842.
- Nayab, S., Bilal Elahi, M. 2024. "The Impact of Exercise Interventions on Pain, Function, and Quality of Life in Patients With Osteoarthritis: A Systematic Review and Meta-Analysis." *Cureus* 16(11):e74464.
- Runge, N., Aina, A., May, S. 2022. "The Benefits of Adding Manual Therapy to Exercise Therapy for Improving Pain and Function in Patients With Knee or Hip Osteoarthritis: A Systematic Review With Meta-analysis." *Journal of Orthopaedic & Sports Physical Therapy* 52(10):675-A13.
- Sanchis-Alfonso, V., Rosello-Sastre, E., Martinez-Sanjuan, V. 1999. "Pathogenesis of anterior knee pain syndrome and functional patellofemoral instability in the active young." *The American journal of knee surgery journal* 12(1):29-40.
- Tsokanos, A., Livieratou, E., Billis, E., et al. 2021. "The Efficacy of Manual Therapy in Patients with Knee Osteoarthritis: A Systematic Review." *Medicina* 57(7):696.
- Zhou, Y., Chin, J., Evangelista, A., et al. 2022. "Inhibiting the Musculoskeletal Pathological Processes in Post-knee Replacement Surgery With Osteopathic Manipulative Treatment: A Systematic Review." *Cureus* 14(1):e21599.
