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Conference Proceedings Of Mithracon 2025

MITHRACON 2025

Theme: Future focussed surgeries and Physio rehab

Sports medicine, Arthroscopy and Arthroplasty – focus on Knee and Shoulder

Date: August 10, 2025

Venue

Radha regent, Electronic city Phase 1, Bangalore

Organized by

Mithra Multispecialty Hospital, Electronic City Phase 1, Bangalore

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MITHRACON 2025 - PHYSIOTHERAPY CONFERENCE SUMMARY

Dr. Rajendran [1] , Dr. Smruti Swagatika [1A] , Dr. Pratik desai [2] , Dr. Murali [3] , Dr. Balakrishnan [4] , Dr. Anil T John [5] ,Dr. Smitha [6] , Dr.Deepa [7] , Dr. Rahana [8] , Dr. Pinky Dutta [9]

1 and 1A.Narayana Institute of physiotherapy 2.Zelus institute of physio therapy 3.St. Peter's medical college 4.Vesmo sports physio 5. PES Medical college 6. Milestones Child development center 7. Akash institute of medical sciences 8. Kincha orthopaedic centre 9. Garden city university

Mithracon 2025 was conducted on August 10,2025 organised by Mithra multispecialty hospital, Bangalore, Karnataka. The theme of the one-day event was on sports medicine, Arthroscopy, Arthroplasty and Physio rehab. The focus was only on Shoulder and Knee.

The sessions started with the current concepts on conservative rehabilitation for patella femoral pain syndrome [1] . In the same mode, conservative pathway for non-surgical meniscal tear was discussed [1A] . In ACL reconstruction the goal is to reach the best functional level for the patient without risking new injuries or degenerative changes in the knee. Rehabilitation is an important part of the treatment. Return to high level of athletic activity has been an indicator of treatment success. Knowledge of healing processes and biomechanics in the knee joint after injury and reconstruction, together with physiological aspects on training effects is important for the construction of rehabilitation programmes [2,3,] .This was covered as return to play essentials in post ACL reconstruction [4] . When there is concurrent meniscus injury, the rehabilitation process becomes complex [3] .The role of core stability in preventing and rehabilitating Paediatric knee and shoulder was discussed in detail in two sessions [6] . Arthroscopy surgeries of the shoulder are used to treat conditions like rotator cuff tears, labral tears, impingement syndrome, and biceps tendon injuries [5] . Advance evolving strategies on restoring shoulder disability and function was discussed in relation to Bankart lesion and shoulder arthroplasty outcomes [7,8] . Biomechanics, injury prevention strategies for badminton players were covered under sports medicine [9] . Dry needling for shoulder was conducted as workshop [1] . The program was well received with delegates expressing strong satisfaction with both content and delivery. The feedback indicated that conference achieved its goals of educating and engaging the delegates in the field of newer surgical and rehabilitation techniques in arthroscopy and sports medicine.

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THE ROLE OF KINEMATIC CHAIN EXERCISES IN REHABILITATION AFTER ROBOTIC TOTAL KNEE REPLACEMENT

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Introduction:
Total Knee Replacement (TKR) is widely performed to alleviate pain and restore function in advanced knee osteoarthritis. Robotic-assisted TKR enhances surgical precision, implant alignment, and patient satisfaction. Kinematic chain exercises — Open Kinematic Chain (OKC) and Closed Kinematic Chain (CKC) — have shown promise in improving functional mobility, pain reduction, and joint control. While both are well-studied in conventional TKR, evidence specific to robotic TKR rehabilitation is limited.

Objective:
To review existing literature on the effectiveness of open and closed kinematic chain exercises in the postoperative rehabilitation of patients undergoing robotic TKR.

Methods:
A narrative review was conducted, searching PubMed, ScienceDirect, and Google Scholar (2010–2024) using keywords such as 'robotic TKR', 'kinematic chain exercises', 'open kinetic chain', 'closed kinetic chain', and 'physiotherapy post knee arthroplasty' including studies on kinematic chain exercises in TKR, research including or referencing robotic-assisted TKR, and clinical trials, reviews, and expert opinion articles.

Results:
OKC exercises (e.g., straight leg raises, knee extensions) effectively improve isolated quadriceps strength, especially beneficial in early postoperative stages when weight-bearing is limited. CKC exercises (e.g., mini squats, sit-to-stand, step-ups) enhance joint stability, proprioception, and functional patterns, proving more beneficial in mid-to-late recovery. Robotic TKR-specific evidence suggests precision surgery allows earlier mobilization and tolerance to kinematic chain exercises.
Combined protocols using early-phase OKC followed by progressive CKC yield optimal recovery outcomes.

Conclusion:
Kinematic chain exercises are essential in robotic TKR rehabilitation. Early OKC aids safe quadriceps activation, while CKC in later stages supports functional recovery. Robotic TKR may permit earlier progression, but standardized, evidence-based rehabilitation protocols tailored to robotic cases are needed.

Keywords: Robotic Total Knee Replacement, Kinematic Chain Exercises, Open Kinetic Chain, Closed Kinetic Chain, Physiotherapy.

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THE EFFECT OF ANTIGRAVITY TREADMILL TRAINING IN POSTOPERATIVE TOTAL KNEE REPLACEMENT REHABILITATION- A NARRATIVE REVIEW

Nandini, Ashuthosh – Narayana Institute of Physiotherapy, Bangalore

Background: Total Knee Replacement (TKR) is a widely performed surgical intervention aimed at relieving pain and restoring mobility in patients with advanced knee pathologies. Postoperative rehabilitation plays a crucial role in achieving optimal outcomes. Among emerging technologies, the antigravity treadmill offers body-weight-supported ambulation, potentially enhancing early mobility and reducing joint loading during gait retraining.

Objective: This narrative review explores and synthesizes current literature on the effects of antigravity treadmill training in individuals undergoing rehabilitation after TKR, with a focus on functional outcomes, gait mechanics, and clinical applicability.

Methods: A narrative review was conducted by searching databases including PubMed, Google Scholar, ScienceDirect, and Cochrane Library for articles published between 2013 and 2025. Keywords such as "Antigravity Treadmill," "Total Knee Replacement," "Rehabilitation," and "Gait Training" were used. Inclusion criteria were: studies involving human subjects post-TKR or similar knee surgeries (e.g., unicompartmental knee arthroplasty), those assessing the impact of antigravity treadmill use on functional recovery, and articles published in English. Conference abstracts without full text and non-English articles were excluded.

Results: Available evidence from pilot studies, case series, and reviews indicates that antigravity treadmill training is safe, feasible, and beneficial in improving early functional mobility post-TKR. Studies reported improvements in KOOS (knee injury osteoarthritis outcome scores), gait parameters, and patient confidence in ambulation. However, methodological limitations, small sample sizes, and heterogeneous protocols restrict the generalization of findings.

Conclusion: Antigravity treadmill training appears to be a promising adjunct to conventional physiotherapy for postoperative TKR rehabilitation. While early outcomes are favourable, further high-quality studies are needed to establish standardized protocols, assess long-term benefits, and evaluate cost-effectiveness for routine clinical use.

Keywords: Total Knee Replacement, Antigravity Treadmill, Postoperative Rehabilitation, Gait Training, Functional Recovery, KOOS, Physiotherapy

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FOOT CORE STRENGTHENING AND STABILITY IN PLANTAR FASCIITIS – A NARRATIVE REVIEW

Niha Deori, Ashuthosh- Narayana Institute of Physiotherapy, Bangalore

Introduction-
Plantar fasciitis (PF) is a common musculoskeletal disorder characterized by heel pain, which can lead to decreased mobility, impaired balance, and increased risk of falls. Recent rehabilitation approaches, including balance board exercises and intrinsic foot muscle (IFM) training, have been developed to enhance postural stability, reduce pain, and improve overall foot function in PF patients.

Aims and Objectives
To review the effects of balance board exercises and intrinsic foot muscle (IFM) training on foot function, pain, and dynamic postural balance in individuals with plantar fasciitis.
To evaluate the impact of balance board exercises on both static and dynamic balance, and role of IFM training in enhancing foot posture, medial longitudinal arch support, and functional performance.
To compare the outcomes of conventional physiotherapy with programs incorporating either balance board or IFM training to determine their relative effectiveness.

Methods
A literature search was conducted in PubMed, CINAHL, SPORTDiscus, and Web of Science (January 2011 to February 2024). Methodological quality was assessed using modified Downs and Black index. One randomized controlled trial comparing conventional physiotherapy with and without balance training over four weeks, assessing static balance via the Biodex Stability System and function using Manchester Foot Pain and Disability Index and review of 16 studies of biomechanical effects of IFM training were reviewed.

Results
Balance board training significantly improved stability indices under both eye-opened and eye-closed conditions. IFM training improved medial arch morphology and dynamic postural balance. Both interventions effectively reduced pain and enhanced foot function.

Conclusion
Integrating balance or IFM training with conventional therapy provides superior improvements in balance, pain relief, and functional performance compared to conventional physiotherapy alone.

Keywords- Plantar fasciitis, balance board exercises, intrinsic foot muscles, postural stability, foot function, rehabilitation.

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SCHROTH METHOD AND ITS EFFECT ON COBB ANGLE, TRUNK ROTATION, AND QUALITY OF LIFE IN IDIOPATHIC SCOLIOSIS- A NARRATIVE REVIEW.

Pavithra G, Ashuthosh – Narayana Institute of Physiotherapy, Bangalore

Introduction
Idiopathic scoliosis, a three-dimensional spinal deformity, is most commonly observed in adolescents and can significantly affect posture, respiratory function, and quality of life (QoL). Conservative treatments such as physiotherapeutic scoliosis-specific exercises (PSSE), particularly the Schroth Method, have gained attention for non-surgical management. The Schroth Method focuses on postural correction, rotational angular breathing, and muscle symmetry to reduce spinal curvature and improve functional outcomes.

Objectives
1)To assess the effect of the Schroth Method on Cobb angle reduction
2)To evaluate changes in angle of trunk rotation (ATR)
3)To analyze improvements in health-related QoL

Methods
A narrative review of the current literature was conducted using databases such as PubMed, Scopus, and Google Scholar for studies published between 2010 and 2024. Keywords used were “Idiopathic Scoliosis ”, “Outcome Measures”, “Quality of life”, and “Functional outcomes ”. Randomized controlled trials (RCTs), clinical trials, and cohort studies focusing on the Schroth Method's effect on spinal deformity and patient-reported outcomes in idiopathic scoliosis were included.

Results
Most included studies reported a significant reduction in Cobb angle (average 4–8°) and ATR after Schroth intervention. Improvements in QoL were observed using standardized tools like SRS-22 and SF-36. Longer intervention durations (>12 weeks) showed better outcomes. Superior outcomes were observed when combined with bracing and performed under supervised physiotherapy.

Conclusion
The Schroth Method offers a clinically meaningful, non-invasive intervention for managing idiopathic scoliosis. It can delay or reduce the need for surgery and improve physical and psychosocial outcomes when applied consistently.

Keywords: Idiopathic scoliosis, Schroth method, Cobb angle, angle of trunk

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INTEGRATING SCAPULAR STRENGTHENING EXERCISES INTO REHABILITATION OF LATERAL EPICONDYLITIS: A NARRATIVE REVIEW

Vidyashree K, Ashuthosh – Narayana Institute of Physiotherapy, Bangalore

Background: Lateral epicondylitis (LE), or tennis elbow, is an overuse tendinopathy characterized by lateral elbow pain and weakened grip strength. Emerging evidence suggests that scapular and shoulder girdle muscle weakness may contribute to distal overload and symptom persistence.

Objective: To analyse evidence on effectiveness of integrating scapular strengthening into LE rehabilitation, assessing impacts on pain, function, and grip strength.

Methods: conducted a comprehensive search of MEDLINE (PubMed), Scopus, CINAHL, PEDro, EMBASE, Web of Science, CENTRAL, and SPORT Discus for studies published between January 2018 and June 2025. Randomized controlled trials, pre–post intervention studies, and cohort research examining scapular or shoulder girdle strengthening in patients with lateral epicondylitis or lateral elbow tendinopathy were included.

Results: In pre–post study of 65 participants, patients achieved ~31-point reductions in PRTEE and a 33.6 % increase in grip strength at one year ($P < 0.001$). A RCT ($n = 26$) found that adding lower/middle trapezius and serratus anterior strengthening to conventional physiotherapy resulted in significant improvements in pain (VAS), PRTEE, pain-free grip force, EMG activity, and scapular muscle strength (time group $P < 0.05$), though scapular positioning did not change significantly. A 2025 systematic review and meta-analysis (six RCTs) reported mean gains of +7.6 points in elbow/wrist function, +15.4 % in grip strength, and increases in serratus anterior and trapezius strength ($p \leq 0.04$), although many effects did not reach clinical significance.

Conclusion: Overall, evidence consistently supports that adding scapular strengthening to standard LE rehabilitation enhances pain relief, functional status, and grip strength, addressing proximal dysfunction and kinetic chain impairment. The variability in clinical significance and protocol heterogeneity underscores the need for high-quality trials to establish standardized dosing and assess long-term benefits.

Keywords: lateral epicondylitis; scapular strengthening; shoulder girdle; tennis elbow; grip strength; rehabilitation.

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EFFECTIVENESS OF RETROWALKING IN PAIN AND FUNCTIONAL DISABILITIES IN OSTEOARTHRITIS KNEE

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Background: Osteoarthritis (OA) of the knee is a common degenerative joint disorder that leads to pain, reduced mobility, and functional limitations, creating a significant social and family burden. Risk factors can be both modifiable (age, gender) and non-modifiable (occupation, sports). Retro walking, a closed kinematic chain exercise, has been utilized for decades and may provide therapeutic benefits for OA knee patients.

Objective: To determine the effectiveness of retro walking in reducing pain and improving functional abilities in individuals with OA knee.

Methods: A narrative review was conducted using PubMed and Cochrane Library, focusing on articles published in the last ten years. Studies were selected based on inclusion criteria: retro walking as the intervention for OA knee, pain as a primary outcome, and randomized controlled trials (RCT) or systematic reviews (SR). Four articles, including three RCTs, met the criteria.
Pain was assessed using the Numeric Pain Rating Scale (NPRS) and functional disability with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).

Protocol Summary: Participants aged 40–70 years with Grade 1–3 OA knee and NPRS ≤ 4 underwent a retro walking program for 10 minutes per session (including warm-up and cool- down), three times per week for 3–6 weeks, covering distances of 10–30 meters. Safety was monitored, and any adverse events led to discontinuation.

Results: The review revealed highly significant improvement in pain and significant improvement in functional disability across studies.

Conclusion: Retro walking is an effective adjunct to conventional therapy for decreasing pain and functional disabilities in OA knee patients, offering a simple, low-cost, and safe exercise option for rehabilitation.

Key words: Osteoarthritis knee, Retro walking, closed kinematic chain exercise

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EFFECTIVENESS OF STRENGTH TRAINING PROTOCOLS ON BONE MINERAL DENSITY IN OSTEOPENIC AND OSTEOPOROTIC POSTMENOPAUSAL WOMEN- A NARRATIVE REVIEW

Aishwarya K and Ashuthosh- Narayana Institute of Physiotherapy, Bangalore

Background:

Osteoporosis and osteopenia are prevalent conditions among postmenopausal women, primarily due to estrogen deficiency, leading to decreased bone mineral density (BMD) and increased fracture risk. Resistance or strength training is increasingly recognized as a non- pharmacological intervention to counter bone loss by enhancing mechanical loading on the skeletal system.

Objective:

To evaluate the effectiveness of structured strength training protocols on improving bone mineral density (BMD) in osteopenic and osteoporotic postmenopausal women.

Methods:

This abstract synthesizes evidence from randomized controlled trials and meta-analyses evaluating strength training effects on bone mineral density (BMD) in postmenopausal women with low bone mass. Studies employed various training intensities, frequencies, and durations. A typical protocol included exercises at 70% and 50% of one-repetition maximum (1RM), performed over 6 months. BMD was primarily measured using DEXA at the lumbar spine, femoral neck, and total hip.

Results:

Strength training significantly improved BMD in postmenopausal women:

- 1.82% increases in lumbar spine BMD after 6 months of training.
- Best outcomes were seen with high-intensity (≥70% 1RM), 3 sessions/week, for at least 48 weeks.
- Training also enhanced muscle strength, balance, and quality of life.
- Supervised programs were more effective than unsupervised ones.

Conclusion:

Strength training protocols, especially those incorporating high intensity and adequate duration, significantly improve BMD in osteopenic and osteoporotic postmenopausal women. These programs offer a safe, affordable, and effective strategy to mitigate bone loss and reduce fracture risk, especially when tailored with supervised, site-specific, and progressive loading.

Keywords: Osteoporosis, Osteopenia, Postmenopause, Strength Training, Bone Mineral Density, Resistance Exercise, DEXA

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THE ROLE OF VR EXERGAMING IN MUSCULOSKELETAL REHABILITATION- A REVIEW OF FUNCTIONAL RECOVERY AND CLINICAL OUTCOMES

Harshita TK and Ashuthosh- Narayana institute of Physiotherapy, Bangalore

Introduction:
Virtual reality (VR) has grown from fitness applications to a viable therapeutic instrument in musculoskeletal (MSR) rehabilitation. The immersive surroundings and gamified activities have different benefits for boosting patient engagement and treatment effectiveness

Aims and objectives:
To assess the effects of VR exergaming on functional recovery including strength, range of motion and balance, examination of clinical outcomes such as pain reduction and adherence rates and discover the most beneficial applications for Musculo skeletal disorders.

Methodology:
A systematic analysis was conducted on 15 studies (2019-2024) covering RCTs, meta analysis and systematic reviews collected from Pubmed, Google scholar and Cochrane. The focus was people with MSK illness undergoing VR exergaming therapies, measuring functional or clinical outcomes. Research linked to Neurological problems or non exergaming virtual reality was eliminated.

Results
VR exergaming reduces chronic low backpain, enhances post operative recovery, and improved adherence compared to traditional therapy. It boosts functional outcomes in MSK rehab, especially for chronic conditions by increasing motivation through gamification. Evidence gaps remain for hip osteoarthritis and acute pain.

Conclusion:
This study underlines VR exergaming's promise as a patient centered scalable tool in MSK rehab, notably for functional recovery and persistent pain. Extensive long term research to promote clinical acceptance is required.

Keywords: Virtual reality, exergaming, Musculoskeletal rehabilitation, Chronic pain

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MANUAL MOBILIZATION TECHNIQUES FOR FROZEN SHOULDER: A NARRATIVE REVIEW

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Background: Frozen shoulder, also known as adhesive capsulitis, is a common musculoskeletal disorder characterized by pain and a progressive loss of shoulder motion. Manual therapy is frequently employed in physiotherapy management, with various mobilization techniques developed to restore range of motion (ROM), reduce pain, and improve function.

Objective: To compare the efficacy of four manual therapy techniques, Kaltenborn, Mulligan Mobilization with Movement (MWM), Gong's Mobilization, and Spencer Technique in managing frozen shoulder through review.

Methods: The evidence from two clinical trials: one comparing Kaltenborn and Mulligan mobilizations, and another comparing Gong's and Spencer techniques, both using Visual Analogue Scale (VAS), Shoulder Pain and Disability Index (SPADI), and goniometric ROM measurements as outcome tools were reviewed. Kaltenborn uses graded traction based on joint mechanics, while Mulligan incorporates pain-free accessory glides during active movement. Gong's method emphasizes end-range posterior gliding and sustained stretching, and Spencer's technique involves rhythmic capsular mobilization in multiple joint planes.

Results: Mulligan mobilization was found to significantly improve pain, ROM (especially flexion, abduction, external and internal rotation), and SPADI scores over Kaltenborn. Similarly, Gong's technique showed superior improvement in pain, ROM (notably medial rotation), and function when compared to the Spencer technique. These findings suggest that techniques incorporating active movement and sustained posterior gliding may offer greater clinical benefits.

Conclusion: Among the manual therapy approaches reviewed, Mulligan and Gong's mobilizations appear more effective than Kaltenborn and Spencer techniques, respectively, in reducing pain and improving shoulder mobility in frozen shoulder patients. Further research with larger sample sizes and long-term follow-up is warranted to confirm these results and refine treatment protocols.

Keywords: Frozen shoulder, adhesive capsulitis, Kaltenborn, Mulligan, Gong's mobilization, Spencer technique, manual therapy, SPADI, VAS, range of motion