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KINETIC CONTROL EXERCISES FOR UNCONTROLLED GLENOHUMERAL–SCAPULAR DISSOCIATION IN A RECREATIONAL BADMINTON PLAYER WITH SCAPULAR DYSKINESIA: A CASE REPORT

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ABSTRACT

Background: Scapular dyskinesia is frequently observed in athletes who perform overhead movements and is linked to changes in shoulder mechanics, discomfort, and diminished functional performance. It is often overlooked as a cause of ongoing neck and shoulder pain, especially in people facing both occupational and one-sided overhead sports-related stress, where poor scapular muscle control can keep symptoms going despite conventional cervical-focused therapies.

Case Presentation: A 43-year -old male, right-handed and employed in the IT field, who also plays recreational badminton, has experienced recurring neck pain over the past three months. Had previously received cervical traction and dry needling therapy. Clinical examination identified Type III scapular dyskinesia, with the Scapular Dyskinesia Test, Scapular Assistance Test, and Scapular Retraction Test, indicating uncontrolled glenohumeral-scapular dissociation as the primary cause of symptoms.

Intervention: The subject underwent a 4-week Kinetic Control Exercise (KCE) program, which advanced from low-load motor re-education to progressive strength training and sport-specific integration, followed by a reassessment at 6 weeks.

Outcomes: During the intervention, pain decreased, scapular muscle strength increased, and dynamic scapular control improved, with these benefits maintained at follow-up.

Conclusion: Targeted KCE focusing on the scapula may serve as an effective and time-saving rehabilitation approach for individuals experiencing neck and shoulder pain linked to scapular dyskinesis, especially among those with dual exposure to occupational and overhead sports activities.

KEYWORDS: Kinetic control exercise; scapular dyskinesia; badminton; glenohumeral–scapular dissociation; case report

INTRODUCTION

Scapular dyskinesis (SD) has been widely studied in shoulder diseases and is characterized by a change in the usual position or motion of the scapula during coupled scapulohumeral motions [1]. Rather than being a stand-alone diagnosis, it is becoming more often acknowledged as a clinically severe mobility disability [2]. According to reports, the prevalence of SD in overhead sports varies from 42% in athletes who are asymptomatic to 81% in players who are symptomatic. In terms of biomechanics, the scapula is an essential component of the upper extremity kinetic chain. Modified scapular mobility is linked to impaired shoulder mechanics, which can lead to discomfort, reduced range of motion (ROM), and possibly worse sports performance [3].

The majority of overuse-related shoulder injuries among recreational badminton players are caused by the non-contact, overhead sport's repetitive biomechanical strain [4]. Badminton players frequently have shoulder pain and injuries as a result of their frequent overhead stroke play [7]. 19–32% of recreational players' upper extremities are at risk due to insufficient conditioning. Shoulder biomechanics can be significantly altered by even one competitive play session, which may increase the risk of injury and cause muscle imbalances [6].

Several therapeutic techniques have been developed to address muscle imbalances in patients with SD, including scapular stability exercises, stretching exercises, strengthening of the scapular stabilizers, flexibility exercises, and postural exercises [7-9]. Nevertheless, there has been little improvement in scapular kinematics with these traditional scapular-focused therapies [8]. Kinetic control (KC) is a movement-based treatment approach that attempts to restore a changed movement mechanics through low-load, and high-repetition activities. By strengthening muscle coordination, optimizing joint alignment, and restoring movement control, Kinetic Control Exercise (KCE) attempts to enhance scapular kinematics, functional stability, and discomfort while minimizing the likelihood of recurrent dysfunction [10].

As a result, this case report details the rehabilitation of a recreational badminton player with scapular dyskinesia and uncontrolled glenohumeral-scapular dissociation with a systematic KCE program. The purpose of the report is to outline

the clinical reasoning, intervention method, and its impact on scapular kinematics, pain, movement control, and functional recovery.

Case Presentation

Patient Demographics And Occupational Profile

The subject was 43-year -old right-handed male IT professional presented to the outpatient physiotherapy department with recurrent neck and shoulder pain on the right side over the past three months. His job was desk-based and involved using a computer and laptop for about 8 to 10 hours daily. He also participates in badminton once a week for recreation and regularly goes to the gym for fitness.

History of Present Illness

The subject described the onset as gradual and stealthy, with recurring episodes of moderate to severe pain, rated 6 out of 10 on the Numeric Pain Rating Scale (NPRS); at rest, his pain level was 2 out of 10. The pain worsened when getting out of bed in the morning, after playing badminton (an overhead sport), and with prolonged laptop use (> 1 hour). The symptoms mainly impacted the right side of the neck and shoulder area, disrupting work responsibilities, recreational badminton, and gym workouts. The subject had no prior history of trauma, cervical or shoulder surgery, fracture, or any other major medical conditions.

Past Treatment History

The patient had previously undergone conservative treatment, including dry needling and cervical traction, which provided only temporary pain relief and failed to improve movement quality or functional performance. He continued to suffer from recurring pain and perceived weakness during overhead tasks and extended periods of desk work.

Postural Observation

The postural assessment showed a slight forward head position accompanied by rounded shoulders. No atrophy, no swelling, and no obvious malposition of the scapula were observed in the resting posture.

Palpation

Palpation disclosed moderate tenderness in the glenohumeral region, right rhomboids and middle fibers of the deltoid muscles (Grade II tenderness), along with marked tenderness (Grade III tenderness) over the right levator scapulae, and upper trapezius. The muscles on the contralateral side showed no tenderness.

Range of Motion (ROM) and Manual Muscle Testing (MMT)

Active ROM in the cervical spine and shoulders was full on both sides, with mild pain occurring at the end range on the right side. No neurological symptoms or movement limitations were detected. MMT showed that the muscle on the affected side retained strength relative to the unaffected side, as detailed in Table-1.

Scapular Dyskinesis Test (SDT) and Kibler's Classification

SDT is a visual dynamic assessment showed abnormal scapular movement, including early elevation, diminished upward rotation, excessive anterior tilt, and prominence of the medial border, occurring during both the upward and downward phases of repeated weighted shoulder flexion and abduction. Kibler's visual classification identifies this as Type III SD, marked by excessive upward movement of the scapula and noticeable prominence of the superomedial border during shoulder motion.

Scapular Assistance Test (SAT)

The patient was instructed to actively raise the right arm, and pain was assessed using the NPRS scale while the examiner manually guided scapular upward rotation by delivering an upward and lateral force to the inferior angle of the scapula and encouraged posterior tilting by pulling on the superior part of the scapula [11]. This maneuver decreased the patient's pain from 7 out of 10 to 3 out of 10 and enhanced the quality of shoulder elevation, with the test showed positive.

Scapular Retraction Test (SRT)

SRT test was also positive, while the examiner manually stabilized the scapula in a retracted position during resisted shoulder elevation in the scapular plane i.e; empty can position [12], the patient showed improved shoulder strength and less symptom provocation, suggesting that poor scapular stabilization played a role in the clinical findings.

Shoulder Pain and Disability Index (SPADI)

The SPADI questionnaire was employed to evaluate the severity of pain and the extent of functional limitation in daily and overhead tasks [13]. At baseline, the patient reported a pain score of 68%, a disability score of 60%, and a total SPADI score of 64%, reflecting moderate to severe shoulder-related impairment.

Functional Limitations

Using the laptop for more than an hour at a time consistently caused neck pain, making it difficult for the patient to finish full workdays without breaks. During recreational badminton, overhead shots like smashes and clears were especially troublesome, causing pain that eroded his confidence and changed how he played. Likewise, gym routines focusing on upper-limb strength through overhead pressing and lateral raises worsened his symptoms and limited his ability to train.

He also detailed experiencing stiffness and discomfort upon waking, as well as difficulty tolerating prolonged static positions, both of which worsened his overall functional limitations.

Clinical Impression

Based on the patient's history and clinical evaluation, right-sided Kibler Type III scapular dyskinesia was identified, characterized by poor neuromuscular control of the scapular stabilizers and failure to maintain proper coordination between the glenohumeral and scapular joints. The subject showed poor neuromuscular control of the scapular stabilizers, as shown by less scapular upward rotation, more anterior tilt, and less posterior tilt during arm movement. Given the lack of structural abnormalities and the presence of movement control impairments, a Kinetic Control Exercise program aimed at correcting improper movement patterns, restoring scapular stability, and enhancing shoulder biomechanics was chosen as the main intervention.

Intervention

The participant took part in a 4-week KCE program aimed at enhancing scapular motor control and addressing uncontrolled glenohumeralscapular dissociation. The programme was divided into two sequential stages.

Phase 1: Motor Control Phase (Week 1-2)

The subject participated in supervised sessions, three to four times per week (on alternate days), as detailed in Table-2. The exercises involved low-load isometric or light-resistance movements, with 5-10 second holds, completed in 10 repetitions per set for 3 sets, lasting 15 to 20 minutes. This phase mainly focused on retraining motor functions and engaging the scapular stabilizers.

Transcutaneous Electrical Nerve Stimulation (TENS) was also provided for pain relief, with a frequency of 30 pulses per second and a pulse width of 250 microseconds, applied for 15 minutes. By the end of the second week, the patient's pain intensity had dropped to 4 out of 10 on the NPRS.

Phase 2: Strengthening/ Functional Phase (Week 3-4)

In weeks three and four, exercise frequency was increased to 4-5 sessions per week, combining both supervised and home-based workouts. This phase involves moderate-load progressive resistance training for 25-30 minutes per session, incorporating rhythmic stabilization holds lasting 20-30 seconds, executed for 12-15 repetitions across 3 sets. This phase emphasized dynamic strengthening and integration tailored to functional and sport-specific needs, gearing the patient toward resuming occupational and recreational activities, including badminton.

RESULTS

After the 4-week KCE intervention program, the patient showed significant improvement in pain, scapular control, muscle strength, and functional ability at the 6-week follow-up assessment.

The NPRS score dropped from 6/10 at baseline to 2/10 during activity and to 0-1/10 at rest. The SPADI demonstrated significant improvement, as the total score dropped from 64% to 20%, reflecting a considerable decrease in both pain and functional disability.

Clinical reassessment indicated improved scapular movement control, with the SDT now displaying only mild dyskinesis, in contrast to the previously observed Type III pattern. The SAT and SRT, which had initially shown positive results, revealed only slight symptom recurrence at follow-up.

Cervical and shoulder range of motion stayed full, but pain was eliminated at the end ranges on the affected side. MMT revealed enhanced strength in the scapular stabilizers, especially the serratus anterior and the middle and lower trapezius, increasing from 4-/5 to 4+/5. The patient also noted better endurance for extended periods at a desk and was able to resume recreational badminton with little discomfort.

DISSCUSSION

This case report details a 43-year -old IT professional and recreational badminton player who presented with right-sided shoulder dysfunction, uncontrolled glenohumeral-scapular dissociation, and neck pain, and showed clinical improvement after completing a 4-week KCE program. The findings indicate that a rehabilitation method focused on movement and motor control rather than just isolated strength trainingcould result in significant improvements in pain levels, scapular function, and overall performance. These outcomes are analyzed within the context of existing literature on SD assessment, its relationship with occupational and sporting demands, and the current evidence backing scapular-focused rehabilitation approaches.

In this subject, the combination of prolonged computer use at a desk and repetitive, one-sided overhead movements from recreational badminton creates a notable risk for SD. Evidence indicates that SD occurs more frequently in athletes who perform overhead movements (61%) than in those who do not (33%) [15]. Studies on elite badminton players have found a prevalence of 73%, with the condition most often affecting the dominant side used for playing and typically manifesting as Type I dyskinesis [16]. These findings highlight the importance of assessing scapular mechanics on the dominant side in athletes who perform unilateral overhead movements, as demonstrated in this case.

In this case, visual classification relied on Kibler's three-pattern system: Type I features inferomedial border prominence, Type II shows medial border prominence, and Type III is characterized by early scapular elevation or excessive upward rotation during arm elevation. The patient exhibited overlapping characteristics of both Type I and Type III patterns [17], a recognized limitation of this qualitative classification, as it becomes less sensitive when the patterns are not clearly

differentiated. This underscores the importance of adopting more objective evaluation techniques, such as 3D kinematic analysis or sophisticated clinical measurement tools, in future assessments.
The phased KCE routine, progressing from low-load motor re-education to strengthening and functional integration, aligns with established principles of scapular rehabilitation. Muscles like the serratus anterior and trapezius, which stabilize the scapula, play a key role in maintaining proper scapulothoracic movement, a factor essential for structured progression in rehabilitation [18]. Positive baseline SAT and SRT also supported a scapular motor control approach over isolated glenohumeral treatment.
The SPADI was selected as a shoulder-specific patient-reported outcome measure because of its proven validity and responsiveness, with a reported minimal clinically important difference of about 8 points [19]. When combined with the NPRS, MMT, and scapular clinical tests (SDT, SRT, and SAT), it allowed for triangulating subjective and objective findings, thus enhancing outcome interpretation even within a single-case design.
Because this is a single case report, the findings cannot be generalized, and without a control group, it's possible that natural recovery, placebo effects, or simultaneous use of TENS helped produce the observed improvements. Moreover, visual classification of scapular dyskinesis is subject to certain reliability constraints. The brief 6-week follow-up period also restricts the ability to draw conclusions about long-term outcomes, particularly considering continued occupational and sporting requirements.

CONCLUSION

This case report underscores the possible efficacy of a structured KCE program in addressing SD accompanied by uncontrolled glenohumeral-scapular dissociation in a recreational badminton player. The intervention resulted in enhanced pain relief, better scapular motor control, increased muscle strength, and improved functional ability within a 6-week timeframe. These findings indicate that a rehabilitation strategy centered on movement and motor control could be helpful in managing SD, especially in people who have both occupational and athletic risk factors. Nevertheless, additional high-quality RCT studies are needed to verify these findings and determine long-term effectiveness.

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Conflict of interest
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Author contribution
1. Niveditha Priya V (First author) - Conceptualization, patient assessment and intervention, data collection, data analysis, literature review, manuscript drafting, and manuscript revision.
2. Muthukumaran Jothilingam (Corresponding author)- Study conceptualization, supervision, clinical guidance, critical review of the manuscript, and final approval of the version to be published.
3. Kamatshi Raj (Third Author): Clinical guidance, data interpretation, literature review, manuscript review and editing, and validation of the final manuscript.
4. Pavithra Jaisankar (Fourth Author) : Clinical supervision, interpretation of findings, manuscript review and editing, validation, and final approval of the manuscript.
All authors reviewed and approved the final manuscript and agree to be accountable for all aspects of the work.

Submission Declaration and Verification
The authors declare that this manuscript is original, has not been published previously, and is not under consideration for publication elsewhere. All authors have reviewed and approved the final version of the manuscript and agree to its submission for publication.

REFERENCES

1. Vila-Dieguez O, Cazorla-Rey A, Michener LA. Clinicians who think scapular dyskinesis is important are more likely to identify it in healthy individuals. Shoulder & Elbow. 2026 Feb 23:17585732261424438.
2. Kibler WB, Lockhart JW, Cromwell R, Sciascia A. Managing scapular dyskinesis. Physical Medicine and Rehabilitation Clinics. 2023 May 1;34(2):427-51.
3. Solana–Tramunt M, Fakoor Rashid H, Norouzi N, Dehghan Y, Khazanin H, Sadegh B, Alimoradi M, Daneshmandi H, Alghosi M. Effects of scapular-focused movement-based exercises on sports performance of athletes with scapular dyskinesis: A systematic review. Plos one. 2026 Apr 10;21(4):e0344540.
4. Nageswari C, Dev G, Thillaieaswaran B. Gender-based analysis of shoulder muscle imbalance in elite university badminton players: a cross-sectional study. Sports Orthopaedics and Traumatology. 2026 Jan 2.
5. Zaman Z, Shakeel A, Anwar S, Asim HM. Association Between Scapular Dyskinesis and Forward Head Posture in Badminton Player: A Cross-Sectional Study. MedERA-Journal of CMH LMC and IOD. 2024 Dec 17;6(1).

6. Adapur VV, Pinto RF, Rajeetha KP. Effect of pre and post badminton match on shoulder rotators strength and range of motion in recreational badminton players. International Journal of Research in Medical Sciences. 2025 Nov;13(11):4857.
7. Tahir I, Memon AG, Aslam M, Rafiq I. Effects of Scapular Dyskinesis on Overhead Athletes' Shoulder Pain and Function: A Review. Journal of Health, Wellness and Community Research. 2026 May 13:1-1.
8. AlOtaibi A, Al Dera H, AlShammari T, Alanazi A, Al Matif S, Idris M. The effect of scapular stabilization exercises on shoulder pain, scapular dyskinesis, muscle strength, and function in patients with subacromial impingement: a systematic review. Retos: nuevas tendencias en educación física, deporte y recreación. 2026(80):773-85.
9. Khodaverdizadeh M, Mohammad Rahimi N, Esfahani M. A systematic review and meta-analysis: The effect of scapular-focused exercise therapy on shoulder pain and function and scapular positioning in people with scapular dyskinesia. Iranian Rehabilitation Journal. 2023 Dec 10;21(4):577-90.
10. Baraskar SS, Shinde S. Effect of Kinetic Control Training and McKenzie's Approach on Pain and Mobility in Cervical Derangement Syndrome: A Comparative Study. Cureus. 2025 Aug 7;17(8).
11. Pechincha Ribeiro L, Py Gonçalves Barreto R, Augusto Souza Fernandes R, Rezende Camargo P. What factors contribute to the Scapular Assistance Test result? A classification and regression tree approach. Plos one. 2022 Oct 21;17(10):e0276662.
12. Khazzam M, Gates ST, Tisano BK, Kukowski N. Diagnostic accuracy of the scapular retraction test in assessing the status of the rotator cuff. Orthopaedic journal of sports medicine. 2018 Sep 25;6(10):2325967118799308.
13. Rajpurohit B, Anap D. Scapular dyskinesis among patients with shoulder dysfunction–A Cross Sectional Study. VIMS JOURNAL OF PHYSICAL THERAPY. 2021 Jul 2;3(1):39-46.
14. Comerford M, Mottram S. Kinetic control-e-book: The management of uncontrolled movement. Elsevier Health Sciences; 2011 Sep 1.
15. Burn MB, McCulloch PC, Lintner DM, Liberman SR, Harris JD. Prevalence of scapular dyskinesis in overhead and nonoverhead athletes: a systematic review. Orthopaedic journal of sports medicine. 2016 Feb 17;4(2):2325967115627608.
16. Mahale A, Bisen R, Kalra K. Prevalence of Scapular Dyskinesia in Elite Badminton Players in Pune. Intern J Health Sci Res. 2020 Nov;1:127-34.
17. Huang TS, Huang HY, Wang TG, Tsai YS, Lin JJ. Comprehensive classification test of scapular dyskinesis: A reliability study. Manual therapy. 2015 Jun 1;20(3):427-32. https://doi.org/10.1016/j.math.2014.10.017
18. Cools AM, Struyf F, De Mey K, Maenhout A, Castelein B, Cagnie B. Rehabilitation of scapular dyskinesis: from the office worker to the elite overhead athlete. British journal of sports medicine. 2014 Apr 1;48(8):692-7. https://doi.org/10.1136/bjsports-2013-092148
19. Porollan JC, Soliño S, Fabani FJ, de Ilzarbe MG, Oyola M, Bossio TA, Morales JM, López J, Villalba FJ, Muhafara G, Policastro PO. Cross-cultural adaptation and psychometric properties of the Argentine version of the shoulder pain and disability index (SPADI) in patients with shoulder disorders. JSES international. 2025 Mar 1;9(2):532-41. https://doi.org/10.1016/j.jseint.2024.11.008

Tables

Table 1- Manual Muscle Testing

Muscles	**Right**	**Left**
Upper Trapezius	4/5	4+/5
Middle Trapezius	4-/5	5/5
Lower Trapezius	4-/5	5/5
Serratus Anterior	4-/5	5/5
Rhomboids	4/5	5/5
Deltoid	4+/5	5/5

Table- 2 4-week Kinetic Control Exercise Protocol and 6th-week follow-up

Week	**Treatment Goals**	**Kinetic Contol Exercise**	**Doseage**	**Progression**
Week 1	Pain modulation Postural and Scapular positional awareness Activation of low-load scapular stabilizers	Chin tucks; low-load serratus anterior punch (supine, arm supported); scapular setting/isometric retraction in supported sitting; supine scapular clock exercise; postural and ergonomic	10 reps× 3 sets Isometric holds 5-10 sec	Pain-free scapular setting achieve NPRS reduced to ≤5/10 Patient demonstrates correct scapular positioning on cueing

		education (workstation setup, laptop height)		
Week 2	Motor control retraining of scapular stabilizers Correction of scapulohumeral rhythm in low-load ranges	Prone low-trap "I" raises (no weight); wall slides with scapular retraction/depression; resisted scapular retraction with light theraband; scapular wall push-up plus (partial range)	12 reps× 3 sets Light theraband resistance	Reduced substitution patterns (no early elevation) on visual observation Improved SAT response MMT of lower trap/serratus improves to 4/5
Week 3	Progressive loading of scapular stabilizers Integration of scapulohumeral coordination through mid-range	Full-range wall/floor push-up plus; prone Y–T–W raises (light dumbbell/ theraband); standing resisted rowing (theraband); closed-chain rhythmic stabilization drills (wall, quadruped)	12 reps× 3 sets Resistance progressed to moderate theraband with rhythmic stabilization of 20- 30 sec	Full-range push-up plus performed without winging Pain during resisted elevation reduced SRT shows further strength gain
Week 4	Functional and sport-specific integration Dynamic control during overhead and reaching tasks	Standing diagonal PNF D2 flexion/extension pattern (light resistance); dynamic reach-and-retract drills; simulated overhead badminton stroke pattern with light theraband; plyometric wall dribble/light medicine ball chest pass	15 reps× 3 sets Sports stimulation drills	Pain-free execution of simulated overhead badminton stroke SD visually reduced/absent during weighted flexion-abduction test Patient confident in return-to-sport tasks
Week 6 (Follow-up)	Reassessment of outcomes	Reassessment: NPRS, cervical/shoulder ROM, MMT (scapular stabilizers), SDT, SAT, SRT, SPADI; review of home exercise adherence	—	Consistent progress was seen in pain reduction, muscle strength, and scapular control; the patient successfully resumed badminton and gym training without symptom return, and a maintenance plan was recommended.