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Rehabilitation and Exercise in Trochlear Dysplasia: A Review of the Literature

Topic: Exercise

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BACKGROUND

Trochlear dysplasia is a morphological abnormality of the femoral trochlea, contributing to patellofemoral instability and recurrent patellar dislocations. Characterized by a shallow or flat trochlear groove, it impairs proper patellar engagement during knee flexion, leading to functional impairment and early-onset patellofemoral osteoarthritis. The prevalence of trochlear dysplasia varies significantly, with imaging studies estimating rates between 3% and 29%, depending on diagnostic criteria. The Dejour classification provides a framework for evaluating severity and guiding treatment strategies, ranging from conservative approaches such as physical therapy to surgical interventions like trochleoplasty and medial patellofemoral ligament (MPFL) reconstruction. This review examines the epidemiology, classification, treatment modalities, and rehabilitation protocols for trochlear dysplasia, emphasizing evidence-based approaches to optimizing patient outcomes.

METHODS

A comprehensive literature review was conducted to analyze epidemiological data, classification systems, treatment strategies, and rehabilitation protocols related to trochlear dysplasia. Advanced imaging techniques, including computed tomography (CT) and magnetic resonance imaging (MRI), were reviewed for their role in diagnosis and classification. Treatment options were assessed, distinguishing between conservative and surgical approaches. Postoperative rehabilitation strategies were examined, focusing on early-stage interventions, functional recovery, and patient-specific rehabilitation plans. Recent cohort studies and clinical trials were included to evaluate outcomes.

RESULTS

Trochlear dysplasia is highly prevalent in patients with patellofemoral instability, identified in up to 96% of individuals with recurrent patellar dislocations. The Dejour classification categorizes the condition into four types (A-D) based on trochlear depth and shape, guiding treatment decisions. Advanced imaging studies have improved diagnostic accuracy, with CT-based studies reporting a 22% prevalence in asymptomatic individuals. Conservative treatment emphasizes quadriceps strengthening, neuromuscular control, and biomechanical optimization. Surgical interventions, particularly trochleoplasty, are indicated for high-grade dysplasia (types C and D), demonstrating significant improvements in stability and patient-reported outcomes. Rehabilitation is critical for postoperative success, with early protocols focusing on pain management, controlled weight-bearing, and range-of-motion exercises. Progression includes strength training, functional exercises, and tailored rehabilitation based on patient-specific factors. Emerging evidence supports individualized rehabilitation programs incorporating open and closed kinetic chain exercises to enhance patellofemoral joint stability without overloading healing structures.

CONCLUSION

Trochlear dysplasia remains a key factor in patellofemoral instability, requiring a multifaceted approach for optimal management. Advances in imaging, classification, and treatment have improved patient outcomes. Individualized rehabilitation plays a crucial role in recovery, ensuring stability and function. Future research should focus on refining rehabilitation protocols to enhance long-term success.

Statement of Disclosures

None

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