



Editorial  
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## Editorial Comment on the Article by M.S. Ryazantsev et al. “Influence of Posterior Tibial Slope on the Risk of Recurrence After Anterior Cruciate Ligament Reconstruction”

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Nikolai N. Kornilov

*Vreden National Medical Research Center of Traumatology and Orthopedics, St. Petersburg, Russia*

### Abstract

The failure of ACL reconstruction may occur not only due to repeated injury but also technical errors or biological reasons. The individual patterns of knee morphology addressed in the study of M.S. Ryasantsev et al., particularly tibial slope. Statistically significant difference does not necessarily mean that it leads to clinical impact on the patient. Therefore, all findings should be discussed from the point of minimal clinically relevant difference, especially if the study is underpowered.

**Keywords:** ACL reconstruction, tibial slope, knee morphology.

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## Редакционный комментарий к статье М.С. Рязанцева с соавторами «Влияние заднего наклона большеберцовой кости на риск рецидива после реконструкции передней крестообразной связки»

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Н.Н. Корнилов

*ФГБУ «Национальный медицинский исследовательский центр травматологии и ортопедии им. Р.Р. Вредена» Минздрава России, г. Санкт-Петербург, Россия*

### Реферат

Неудачные исходы реконструкции передней крестообразной связки могут быть обусловлены не только повторной травмой, но и рядом других причин, среди которых все большее внимание уделяется не только техническим ошибкам и осложнениям, но и биологическим факторам, в частности особенностям морфологии коленного сустава, изучению которых и посвящена обсуждаемая статья. С практической точки зрения статистически значимые различия в сравниваемых параметрах следует трактовать только с учетом минимально клинически значимых величин, особенно если статистическая сила исследования недостаточна из-за малой выборки.

**Ключевые слова:** реконструкция передней крестообразной связки, задний наклон большеберцовой кости, морфология коленного сустава.

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✉ Nikolai N. Kornilov; e-mail: drkornilov@hotmail.com

✉ Корнилов Николай Николаевич; e-mail: drkornilov@hotmail.com

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The study by M.S. Ryazantsev and colleagues addresses an important aspect of the conceptual shift in the surgical treatment of patients with anterior cruciate ligament (ACL) rupture in modern traumatology and orthopedics. The global research trend in recent decades has shifted from discussing the optimal technical conditions of ACL surgical reconstruction (such as graft selection, specifics of canal positioning, their quantity and formation method, fixation options, etc.) towards a comprehensive assessment of individual anatomical, physiological, and functional patient characteristics that contribute to ACL injury, without diminishing the importance of trauma as the main factor [1].

This shift in focus was prompted by the increasing rate of revisions and re-revisions after primary ACL reconstruction, where atraumatic recurrent ACL ruptures are not uncommon in the etiology. A study by A.S. Saprykin and colleagues, analyzing 257 revision and repeat revision ACL reconstructions, found that 38.9% of cases had no history of traumatic re-injury [2]. While technical errors, infectious complications, and rehabilitation errors are the leading factors, the underestimation of modifiable patient characteristics also increases the risk of complications.

Excessive posterior tibial slope (PTS), primarily the lateral slope, is recognized by many researchers as an important factor contributing to recurrent instability after ACL surgery. This is in addition to frontal limb deformity, the mechanical integrity of other static stabilizers (such as the anterolateral ligament, posterior lateral corner), and the functional condition of lower limb muscles. For instance, the ESSKA consensus on revision ACL surgery recommends performing a corrective osteotomy of the tibia to correct the posterior slope angle when it measures equal to or greater than  $12^\circ$  [3]. Interestingly, even isolated tibial slope correction can provide adequate knee joint stability for some patients, eliminating the need for ACL re-reconstruction.

The main finding of M.S. Ryazantsev and colleagues' work is that only the lateral tibial plateau slope, not the medial slope, significantly differed between the group of patients who underwent revision ACL surgery and the sample of patients who had primary ACL reconstruction.

Extrapolating these findings theoretically to the clinical decision-making process raises the question of the need for isolated lateral tibial plateau osteotomy to correct its pathologic posterior slope in patients with ACL injuries. Such interventions are usually performed in patients with malunion fractures of the lateral tibial plateau because, despite the integrity of all ligaments, they complain of knee joint instability caused by bone morphology [4].

It's worth mentioning another trend in contemporary orthopedic research: the shift from simplifying the interpretation of detected differences from statistically significant to minimally clinically significant differences [5]. A statistically significant difference is merely a mathematical term indicating the unlikelihood of random differences, and this fact is amplified in studies with large sample sizes. However, not every statistically significant difference automatically implies clinical significance [6]. While the authors were able to demonstrate that the differences in the  $2.1^\circ$  slope of the lateral tibial plateau between the groups of patients with primary and revision ACL surgery were statistically significant, whether clinicians should take this into account in their practice when making decisions about the scope of surgical treatment unfortunately remains beyond the scope of this article.

Among other limitations of this study, important for clinicians, the following should be mentioned. Firstly, the study would have been strengthened by comparative radiological and magnetic resonance tomographic evaluation of the slopes of bony and soft tissue structures (cartilage and menisci, respectively). The latter significantly mitigates differences between the medial and lateral compartments of the knee joint, reducing the magnitude of the actual posterior slope [7, 8]. Secondly, increasing the statistical power to an adequate level through a much larger analyzed sample might have allowed for new data to be obtained on other anatomical factors associated with the risk of ACL re-rupture following its reconstruction, including the medial tibial slope.

In conclusion, this publication highlights a relevant shift in the paradigm of modern approach: from treating such patients as a problem of isolated surgical intervention to the analysis

of individual morphological features of the knee joint as an organ in particular and the locomotor unit of the lower limb as a whole. This shift is

expected to aid in making relevant clinical decisions to reduce the frequency of ACL re-ruptures after its reconstruction in the future.

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## Author's information

✉ Nikolai N. Kornilov — Dr. Sci. (Med.)

Address: 8, Akademika Baykova st., St. Petersburg, 195427, Russia

<https://orcid.org/0000-0001-6905-7900>

e-mail: drkornilov@hotmail.com