



# The 100 Top-Cited Articles on Medial Patellofemoral Ligament: A Bibliometric Analysis and Review.

Andreas Panagopoulos, MD, PhD<sup>1</sup>; Vasileios Giannatos, MD<sup>1</sup>; Panagiotis Antzoulas MD, Msc<sup>1</sup>; John Lakoumentas MD, PhD<sup>1</sup>; Vasileios Raoulis MD, PhD<sup>2</sup>; Michael Hantes MD, PhD<sup>2</sup>  
<sup>1</sup>University of Patras, <sup>2</sup>University of Thessaly

## ABSTRACT

Reviewing previous bibliometric articles on Scopus and PubMed, we found articles on ACL and PCL reconstruction, and patellar instability, but no bibliometric articles were found on MPFL. The purpose of our study was to identify the 100 most cited articles on MPFL from 1992 onwards and to describe the characteristics of articles, providing a reference for better comprehending the globus research, and also highlighting potential directions for future research.

## INTRODUCTION

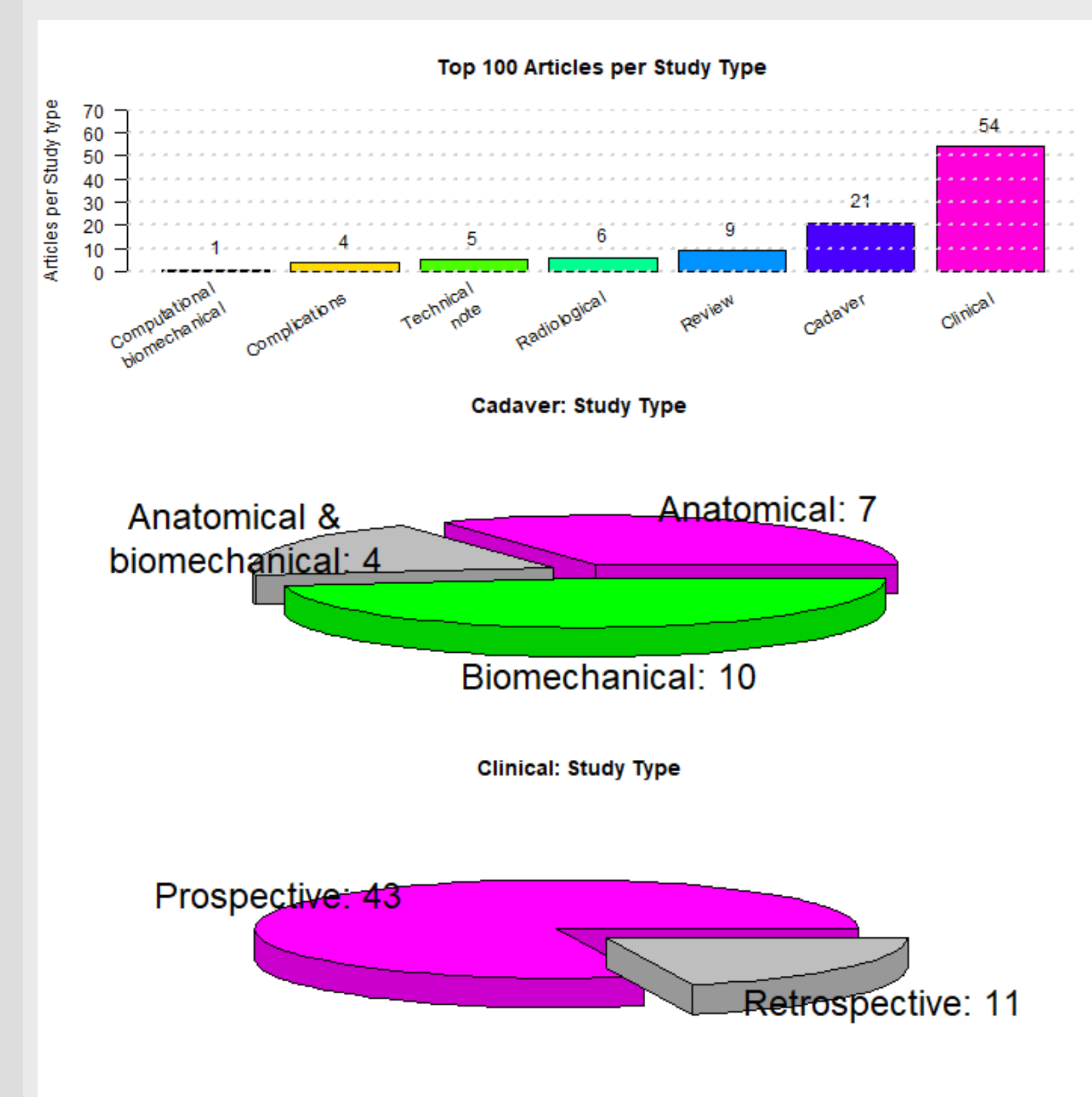
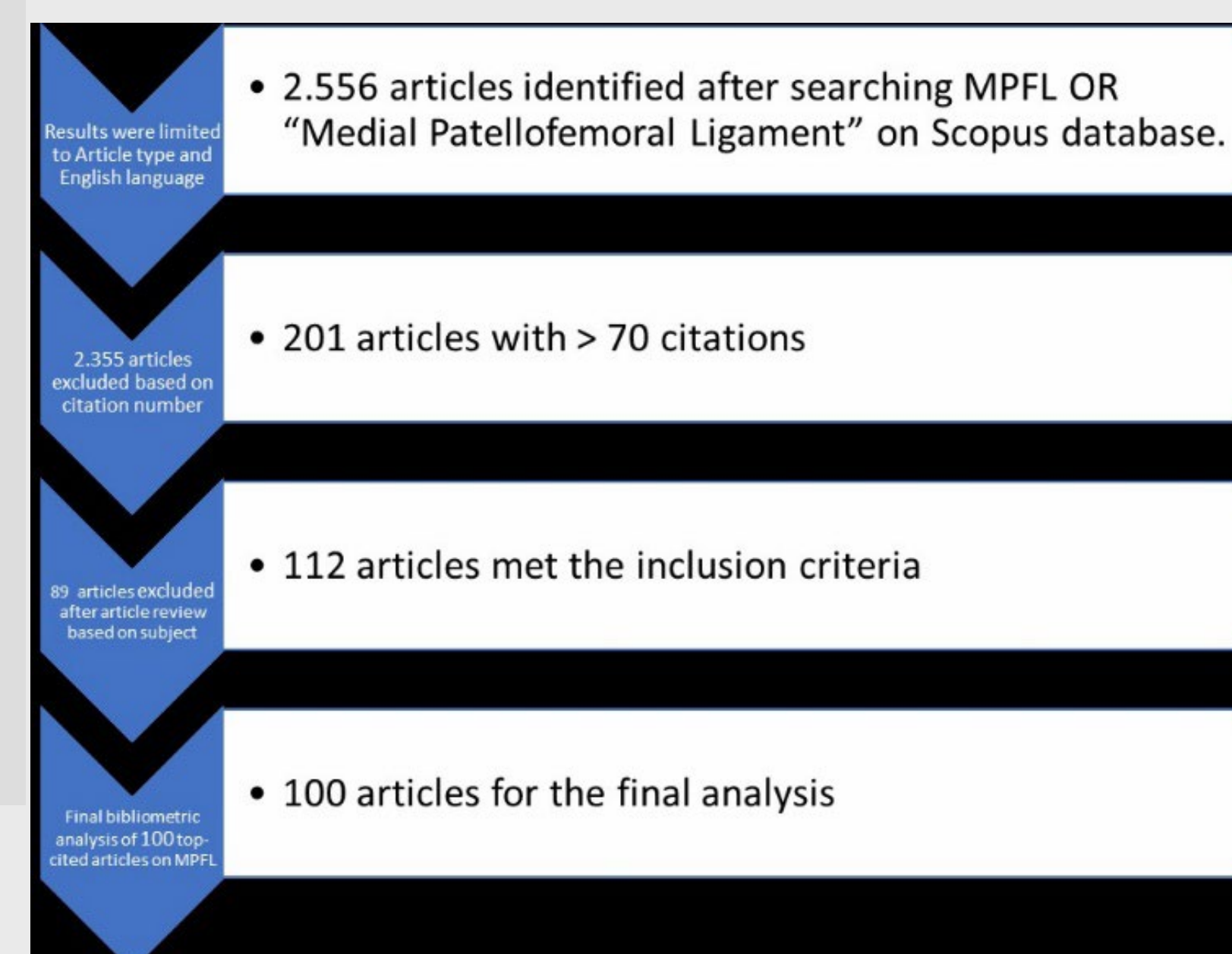
The concept of medial patellofemoral ligament (MPFL) has become widely investigated in the last 30 years and resulting in many research achievements in this field. Patellar dislocation/instability is a common knee problem affecting about 5.8 persons per 100.000 of the general population and 29 per 100.000 in the 10 to 17 years old age group. It accounts for 2-3% of all acute knee injuries. The causes lie in osseous abnormalities, patellar alta, trochlea dysplasia, tibial tubercle-trochlea groove distance >20 mm, valgus malalignment, patellar tilt, and soft tissue laxity, usually due to medial patellofemoral ligament (MPFL) rupture or vastus medialis oblique (VMO) weakness. Numerous studies have proposed that MPFL reconstruction is superior to conservative management in terms of functional outcomes and recurrent episodes among patients with recurrent patella instability. Although a non-operative treatment is primarily recommended for the first-time dislocators, a percentage of 44-70% progress finally to recurrent dislocation and subsequent surgical management. As MPFL reconstruction has been an increasingly accepted procedure, we have decided to identify the 100 most cited articles on MPFL.

## METHODS AND MATERIALS

The purpose of our study was to identify the 100 most cited articles on MPFL from 1992 onwards and to describe the characteristics of articles, providing a reference for better comprehending the globus research, and also highlighting potential directions for future research. We performed a key-based analysis, using the terms “medial patellofemoral ligament” OR “MPFL”, in Scopus database. The search was confined to English-language articles and performed on December 2022. Technical notes, systematic reviews on clinical outcome or complications, clinical studies and basic science articles were included whereas letters, case reports, personal opinions, guidelines, editorials, narrative or other type of reviews were excluded. Analysis was performed according to first author’s name, journal, publication year, total number of citations, average citations per year (ACY), geographic origin, institution, research category, level of evidence, and keywords. Statistical analysis and data visualization was held in R and RStudio.

## RESULTS

The total number of citations was 15.178 (range, 72-692). Clinical studies consisted the vast majority (54%), cadaveric being the second most popular (24%). USA was in the first place (32%) of authorship with Japan (15%) and Germany (13%) following. *American Journal of Sports Medicine* ranked in the first place of the top-100 cited articles (37/100; 6304 citations) as well as of the top-10 cited articles according to ACY (7/10; mean: 340.3 citations). The most prolific authors were Nomura from Japan (8 articles), Burks (6 articles) and Inoue, Sillanpaa and Dreyhaupt (5 articles each).



## DISCUSSION

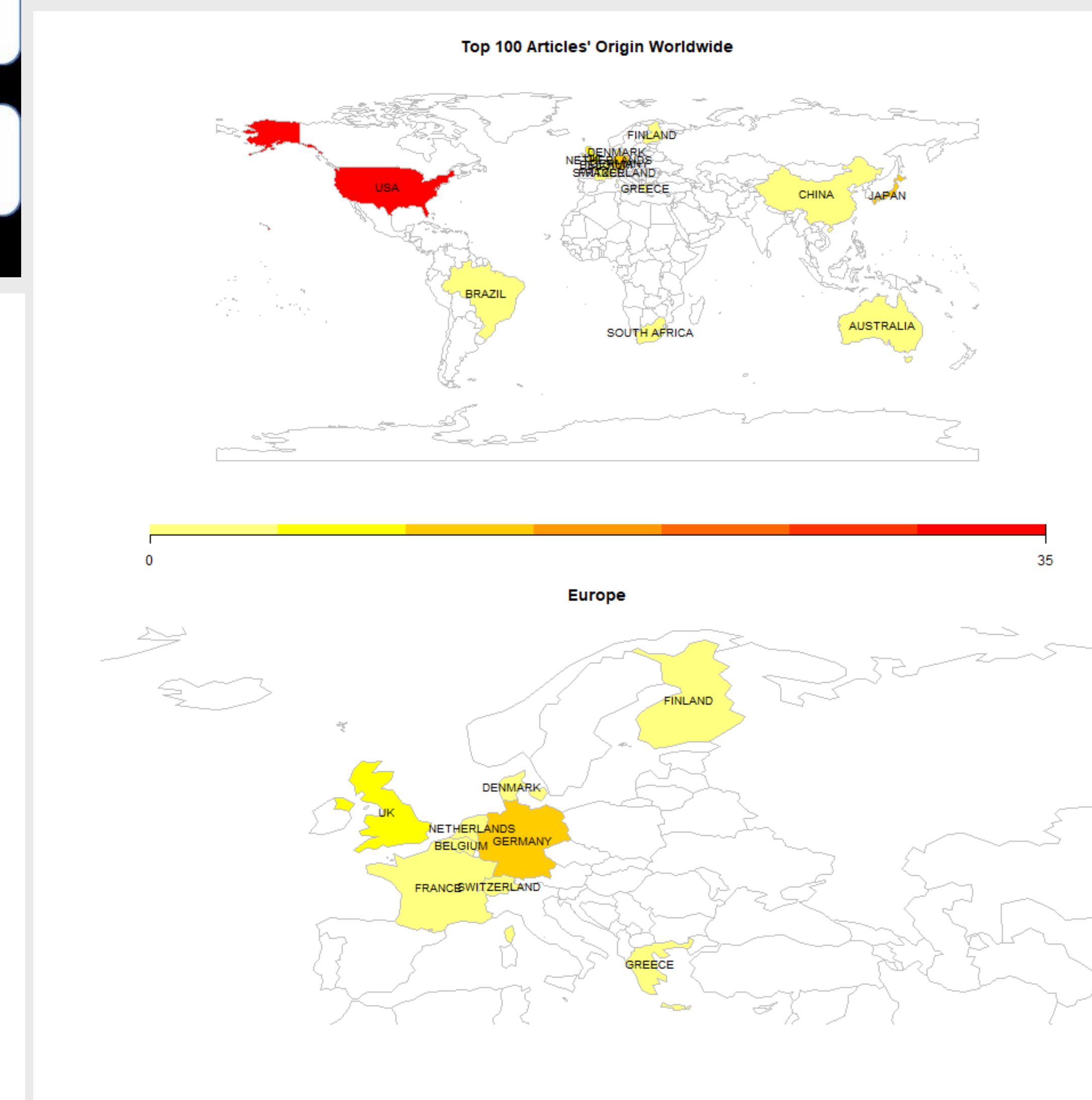
By analyzing the characteristics of the 100 top-cited articles, this study demonstrated that MPFL is a growing and popular area of research, with the focus varying through timeline trends. Questions regarding MPFL anatomy, isometry and biomechanics might have been answered adequately, but research regarding optimal fixation technique under various circumstances is still trending. A wide agreement regarding MPFL femoral and patellar attachments was identified, on the superomedial part of the patella and just distally to the adductor tubercle on the femur. The recognition of the anatomic insertions especially in the femur are key elements of a successful reconstruction and the radiological Schöttle’s point can aid in that direction. The blending of MPFL with VMO and the two bundles of MPFL providing dynamic stability during knee flexion are also described by many authors. Despite the numerous soft tissue structures in the region, MPFL shows the greatest contribution by 50-60% against lateral displacement. Nevertheless, MPFL reconstruction has proven to be a great procedure with repeatable results, although technically demanding. Even at the presence of coexistent abnormalities like increased TT-TG distance, patella alta, femoral anteversion or trochlea dysplasia, isolated reconstruction of the MPFL has been shown to prevent recurrent episodes of dislocation.

## CONCLUSIONS

The medial patellofemoral ligament has been a hotspot of sports medicine research since 1992, with research interest growing year per year. Traditional players in sports research such as USA, Germany, Japan and AJSM contribute here also the biggest part. Questions regarding native MPFL anatomy, isometry and biomechanics might have been answered adequately, but research regarding optimal fixation technique under various circumstances is trending.

## REFERENCES

1. Thaanat M, Erasmus PJ. The favourable anisometry: an original concept for medial patellofemoral ligament reconstruction. *Knee*. 2007;14(6):424-428. doi:10.1016/j.knee.2007.08.008
2. Tompkins MA, Arendt EA. Patellar instability factors in isolated medial patellofemoral ligament reconstructions--what does the literature tell us? A systematic review. *Am J Sports Med*. 2015 Sep;43(9):2318-27. doi: 10.1177/0363546515571544
3. Victor J, Wong P, Witvrouw E, Sloten JV, Bellemans J. How isometric are the medial patellofemoral, superficial medial collateral, and lateral collateral ligaments of the knee?. *Am J Sports Med*. 2009;37(10):2028-2036. doi:10.1177/0363546509337407
4. Stefancin JJ, Parker RD: First-time traumatic patellar dislocation: a systematic review. *Clin Orthop Relat Res* 2007, 455:93-101.
5. Smith TO, Walker J, Russell N. Outcomes of medial patellofemoral ligament reconstruction for patellar instability: a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2007;15(11):1301-1314. doi:10.1007/s00167-007-0390-0
6. Schöttle PB, Schmeling A, Rosenstiel N, Weiler A. Radiographic landmarks for femoral tunnel placement in medial patellofemoral ligament reconstruction. *Am J Sports Med*. 2007;35(5):801-804. doi:10.1177/0363546506296415
7. Raoulis V, Tsifountoudis I, Fylos A, et al. A computed tomography cadaveric study of the radiological anatomy of the patella: the size of the patella correlates with bone bridge between tunnels and R angles are introduced for safe tunnel drilling during MPFL reconstruction. *J Exp Orthop*. 2021;8(1):29. doi:10.1186/s40634-021-00348-9



## CONTACT

Andreas Panagopoulos  
Assistant Professor of Orthopedics  
University of Patras  
Email: [andpan21@gmail.com](mailto:andpan21@gmail.com)