

A REVIEW ON CRANIAL CRUCIATE LIGAMENT RUPTURE AND RESOLUTION USING TIBIAL PLATEAU LEVELING OSTEOTOMY

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ABSTRACT

In the last few decades there has been an ongoing debate in the community regarding which surgical procedure is the most optimal solution for cranial cruciate ligament rupture (CrCLR) (1, 2). Over sixty surgical techniques have been described for the treatment of CrCLR (3), a number that continues to rise. (4, 5). Within this, the Tibial Plateau Leveling Osteotomy (TPLO) remains to this day one of the most widely used surgical techniques for CrCLR and has inspired many new techniques. Numerous reviews and studies have been carried as an attempt to compare and describe the outcome of said techniques but even to this day, the answer remains unclear (6, 7).

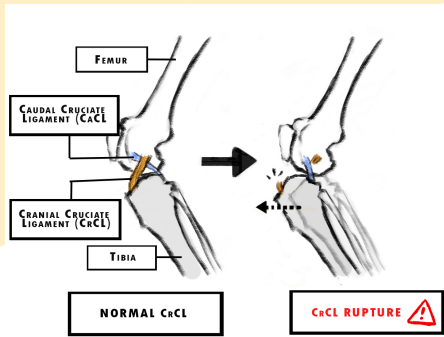


Figure 1: Illustration of the process of cranial cruciate ligament rupture demonstrating the cranial movement of the tibia in relation to the femur.

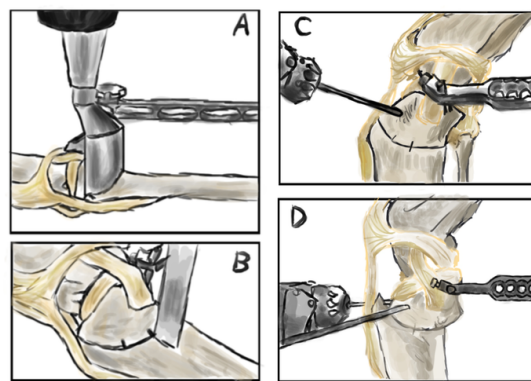


Figure 2: Illustrations showing the TPLO procedure: making a semi-circular cut on the proximal part of the tibia (A), making markings for the right rotation (B), preparation for rotating the segment by securing the hold (C) rotation of the tibial segment (D)

OBJECTIVES

The objective of this review is to explore the most important aspects of CrCLR and its treatment through TPLO, including the etiopathogenesis, the biomechanics, complications, etc. in order to explore where the knowledge of the community has advanced, what remains to be answered and most importantly what seems to be the most optimal solution at this given time.



METHODOLOGY

This review has been carried out primarily by using the Pubmed database as well as Fossum's 5th edition of Small Animal Surgery (1) and Muir's 2nd edition of Advances in The Cranial Cruciate Ligament (2). Other sources such as the Colorado State University Veterinary Teaching Hospital official website and the Veterinary Information Network (VIN) interphase were also used. A total of 67 research articles, 3 books, and 2 official veterinary websites, 1 patent reference, and 1 TPLO manual were consulted; of those, around 73% were published within the last 6 years, with more than two-thirds of them published within the 2017-2020 time range.

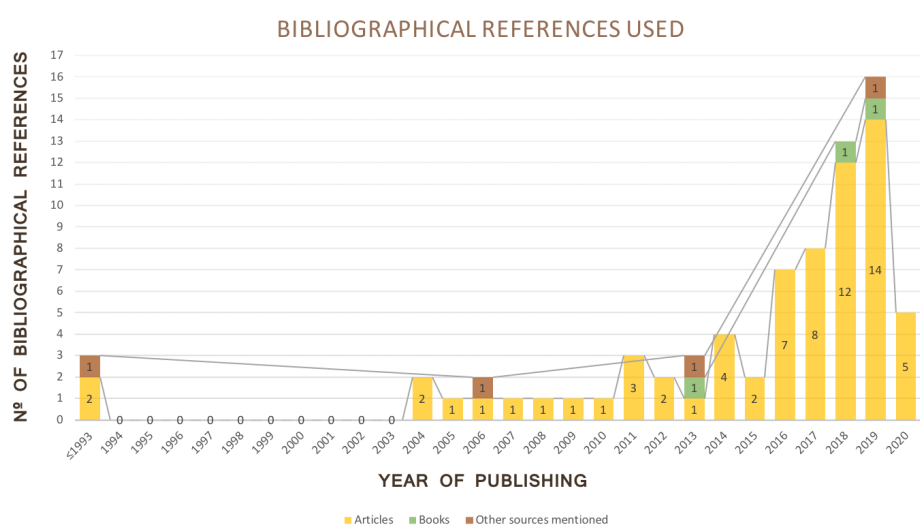


Figure 3: Graph representing the numbers of references used in the review and their respective year of publishing.

CONCLUSION

It seems that many subjects are still in need of research, mainly emphasizing: OA progression/prevention after TPLO, potential carcinogenic effect of TPLO, investigation on the etiopathogenesis of CrCL on different dog breeds, the application of TPLO in other species, the usefulness of postoperative antibiotics against SSI, and finally more research/advances on novel techniques like CBLO or even TKR. In general, an overwhelming amount of retrospective studies exist on TPLO and CrCLR; however, it seems that there is a general scarcity of strong objective evidence as well as a problematic subjective evaluation protocol for lameness and clinical evolution. All in all, TPLO seems to have fewer overall complications compared to TTA as well as other resolution techniques for CrCLR and currently seems to be the best option in large breed dogs. The application of TPLO in smaller breed dogs, cats, and even llamas shows great potential for TPLO use in other species and requires further data. Using TPLO with a correct patient selection, application of novel preoperative planning protocols, novel aseptic protocols, and recent postoperative complementary treatments seems to currently be the best option for an optimal clinical outcome in treating CrCLR.

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- Figure 1 & 2: Images created by the author, Sara Masson
 -Figure 2: "Background Poster Picture of Dog" by Jack Brind. [CC BY 4.0] [Internet]. 2019 [cited 02 June 2020]. Available from: https://unsplash.com/photos/rmvG_oHzCNA