

SEARCH

AVMA Journals

- Both journals
- JAVMA
- AJVR
-

Advanced Search
Saved Searches

JAVMA News
Classified Ads
CE Listings

Register

Activate
Individual
Institution

AVMA Home
Journals Home
Contact Us
Help

Abstract

American Journal of Veterinary Research

January 2017, Vol. 78, No. 1, Pages 27-35
<https://doi.org/10.2460/ajvr.78.1.27>

Biomechanics of an orthosis-managed cranial cruciate ligament-deficient canine stifle joint predicted by use of a computer model

Gina E. Bertocci PhD; Nathan P. Brown PhD; Patrice M. Mich DVM, MS

Department of Bioengineering, J.B. Speed School of Engineering, University of Louisville, Louisville, KY 40202. (Bertocci, Brown); Wheat Ridge Veterinary Specialists, 3695 Kipling St, Wheat Ridge, CO 80033. (Mich)

Address correspondence to Dr. Bertocci (g.bertocci@louisville.edu).

The first 2 authors contributed equally to the manuscript.

OBJECTIVE To evaluate effects of an orthosis on biomechanics of a cranial cruciate ligament (CrCL)-deficient canine stifle joint by use of a 3-D quasistatic rigid-body pelvic limb computer model simulating the stance phase of gait and to investigate influences of orthosis hinge stiffness (durometer).

SAMPLE A previously developed computer simulation model for a healthy 33-kg 5-year-old neutered Golden Retriever.

PROCEDURES A custom stifle joint orthosis was implemented in the CrCL-deficient pelvic limb computer simulation model. Ligament loads, relative tibial translation, and relative tibial rotation in the orthosis-stabilized stifle joint (baseline scenario; high-durometer hinge) were determined and compared with values for CrCL-intact and CrCL-deficient stifle joints. Sensitivity analysis was conducted to evaluate the influence of orthosis hinge stiffness on model outcome measures.

RESULTS The orthosis decreased loads placed on the caudal cruciate and lateral collateral ligaments and increased load placed on the medial collateral ligament, compared with loads for the CrCL-intact stifle joint. Ligament loads were decreased in the orthosis-managed CrCL-deficient stifle joint, compared with loads for the CrCL-deficient stifle joint. Relative tibial translation and rotation decreased but were not eliminated after orthosis management. Increased orthosis hinge stiffness reduced tibial translation and rotation, whereas decreased hinge stiffness increased internal tibial rotation, compared with values for the baseline scenario.

CONCLUSIONS AND CLINICAL RELEVANCE Stifle joint biomechanics were improved following orthosis implementation, compared with biomechanics of the CrCL-deficient stifle joint. Orthosis hinge stiffness influenced stifle joint biomechanics. An orthosis may be a viable option to stabilize a CrCL-deficient canine stifle joint.

[Full Text](#) [PDF \(712 KB\)](#) [PDF Plus \(419 KB\)](#)

[Home > Journal home > TOC > Abstract](#)

[Prev. Article](#) | [Next Article](#)
[View/Print PDF \(712 KB\)](#)
[View PDF Plus \(419 KB\)](#)
[Add to favorites](#)
[Email to a friend](#)
[XML TOC Alert](#) | [Citation Alert](#) [What is RSS?](#)

Quick Links
<ul style="list-style-type: none"> • PubMed Citation • Alert me when new articles cite this article • Download to citation manager • Related articles found in: AVMA, PubMed • View Most Downloaded Articles
Quick Search
<input type="text" value="AVMA"/> for Authors: <ul style="list-style-type: none"> <input type="checkbox"/> Gina E. Bertocci <input type="checkbox"/> Nathan P. Brown <input type="checkbox"/> Patrice M. Mich <input type="button" value="SEARCH"/>



American Veterinary Medical Association
Copyright © 2019

Technology Partner - [Atyon Systems, Inc.](#)

