

## **Sample Abstracts**

### **Sample 1:**

#### *Development of a Functional Knee Brace for Patients with Medial or Lateral Compartment Syndrome Caused by Osteoarthritis*

##### Abstract

The main goals of this project were to create a functional knee brace that would provide stability to the knee, correct medial or lateral compartment syndrome, and prevent hyperextension while maintaining free movement of the knee.

As the brace is a custom-fit brace, the first step was to cast the patient's leg and create a plaster model. Then a ¼" piece of polyethylene was thermoformed around the model to give an exact fit to the patient's leg. The brace was cut to shape out of the plastic and the hinges and straps were riveted into place. After testing was completed using a Goniometer, the brace was found to be effective in stabilizing the knee and preventing hyperextension.

This brace is different from others because it uses different lengths of uprights to achieve to three points of pressure that are needed to push the knee into the correct position. Single axis hinges were used. This does not correct either compartment syndrome but still provides stability to the knee.

It was found that the brace did restrict flexion. The knee in natural flexion was measured at 332.5° for the lateral side and 336.5° for the medial. With the brace, however, flexion was measured at 293.5° from the lateral side and 295.4° for the medial side. As it doesn't correct lateral or medial compartment syndrome because the correct hinges were unattainable.

## **Sample 2:**

### The Effects of *Agrilus planipennis* Habitat Destruction on the Population Density, Distribution, and Diversity of Limno-Terrestrial Tardigrades Residing on the Lichens of *Fraxinus pennsylvanica*

#### ABSTRACT

The purpose of this study was to determine if alterations in abiotic resources associated with Emerald Ash Borer (*Agrilus planipennis*) habitat destruction affect the characteristics of local tardigrade populations. A field study was conducted at an Emerald Ash Borer infested and non-infested forest in central and west-central Michigan. A total of 80 lichen samples were collected from a series of 20 Green Ash (*Fraxinus pennsylvanica*) trees that were equally distributed between control and experimental sites. Lichen samples were hydrated for approximately 24 hours and were searched for microscopic life under low magnification. Amounts of tardigrades, nematodes, and other notable microscopic organisms were recorded and tardigrade specimens were later identified to species. Gross populations of tardigrades and nematodes were compared between sample sites with the use of a two-tailed equal variance t-test (alpha level 0.05) which generated a p-value of 0.0001 for tardigrades and  $7.4946^{-24}$  for nematodes. Significant differences between populations of tardigrades located among Emerald Ash Borer infested and non-infested sites were found, rejecting the null hypothesis. Although the diversity of the tardigrades was primarily the same and consisted of the cosmopolitan species *Ramazzottius baumanni*, *Milnesium tardigradum*, *Macrobiotus echinogenitus*, and *Macrobiotus cf. hufelandi*, more tardigrades were observed during initial observational periods from samples extracted from the infested experimental site than from samples extracted from the non-infested control site. These results suggest that differences in abiotic resources amongst habitats may influence tardigrade populations by affecting the rate of lichen growth on trees, especially with respect to environments experiencing biological invasions.