

ABSTRACT:

A CUSTOM PCL BRACE USING MODERN SCANNING AND 3D MODELING TECHNOLOGY. THE SKANECT IS USED IN ORDER TO CREATE A LEG MODEL THAT IS PARTICULAR TO THE ONE WHO IS SCANNED. FEATURES CAN BE MODELED AND CREATED BASED OFF THE 3D MODEL AND MEASUREMENTS OF THE INJURED PERSON. PROGRAMS SUCH AS FUSION 360 AND COREL DRAW ARE USED TO CREATE PHYSICAL MODELS AND FEATURES.

RESEARCH QUESTION:

HOW CAN MODERN SCANNING AND 3D MODELING SOFTWARE BE USED TO CREATE A CUSTOM KNEE BRACE FOR THE RECOVERY PERIOD OF A PCL INJURY?

RESEARCH:

MOST OF OUR RESEARCH WAS BASED UPON LEARNING ABOUT COMMON KNEE INJURIES AND THE DIFFERENCES WITH KNEE BRACES. MANY OF THESE QUESTIONS WERE ANSWERED BY DR. DEWANJEE AND THE STAFF AT FXRX ORTHOPEDICS AND BRACING.

PROCESS:

- MAKING CONTACT WITH A PROFESSIONAL TO ADDRESS INITIAL QUESTIONS SUCH AS HOW AND WHERE TO APPLY PRESSURE TO THE KNEE.
- DECIDING FEATURES AND FUNCTIONS TO SEPARATE BRACE FROM STANDARD BRACES.
- MEASURING AND FITTING OF BASE SLEEVE.
- BRAINSTORMING AND FINDING MATERIAL.
- DESIGNING BRACE SUPPORTS ON COREL DRAW, FOLLOWED BY LASER CUTTING.
- MODELING PRINTABLE MATERIAL ON FUSION 360.
- FABRICATION OF ALL THREE MATERIALS FOR A FUNCTIONING CUSTOM PCL BRACE

RESULTS:

MULTIPLE METHODS WERE USED TO CREATE THE DIFFERENT PIECES OF THE FINAL PRODUCT. THROUGH TRIAL AND ERROR WE'VE MANAGED TO CREATE A CUSTOM BRACE THAT FOLLOWS THE REQUIREMENTS.

CONCLUSION:

THE KNEE IS A FRAGILE JOINT IN WHICH IF ANY OF THESE COMPONENTS WERE TO LOOSEN OVER TIME ADDITIONAL SUPPORT WOULD BE NEEDED. IN ADDITION ONE OF THE KEY COMPONENTS OF A WORKING BRACE IS FOR IT TO CLOSE TO THE SKIN AS POSSIBLE. THE TECHNOLOGIES WE HAVE AVAILABLE TO US NOWADAYS ALLOW US TO CREATE A BRACE THAT IS ABLE TO SOLVE PROBLEMS OURSELVES WHILE MITIGATING COSTS.

REFERENCES:

DR. DEWANJEE. FXRX ORTHOPEDICS & BRACING. PERSONAL INTERVIEW. 15 MARCH 2016.

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CUSTOM PCL BRACE

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