A.Explanation of the Work

As a fourth-year student majoring in exercise physiology at Chico State, I've observed many athletes, friends, and family members suffering from tendinopathy. Tendinopathy is a condition in which the connective tissue that connects muscle to bone becomes inflamed. Tendinopathy reduces exercise tolerance and increases pain. Tendinopathy is caused by excessive muscle overload, excessive lumbopelvic sagittal plane movements, and other bio-musculoskeletal intrinsic factors (Thorborg et al., 2010). The current treatments include corticosteroid injections, surgery, weight loss, and appropriate rehabilitation (Canosa-Carro et al., 2021) (Gloom et al., 2016). Undergoing tendinopathy can be expensive to treat, time-consuming to manage, and causes physical inactivity. However, there is a lack of study that explores effective exercise training to strengthen weak muscles and tendons, which potentially reduces the incidence of tendinopathy. Hamstring tendinopathy is common in long-distance runners and athletes performing quick changes of direction, such as hockey, tennis, and football players. The symptom is manifested as deep pain in the buttock.

The goal of this proposed research is to examine the impact of an exercise program. This program focuses on stretching and progressive loading of the hamstring muscle in Chico State students, who have previously experienced hamstring strains. The study design consists of three stages (Stage 1: baseline hamstring muscle function tests; Stage 2: Eight weeks of exercise training; Stage 3: post-intervention hamstring muscle function tests). Dr. Feng He will provide cutting-edge lab equipment (Biodex-System 4) training, for muscle function tests.

B. Student contributions to project design and execution

Weak hamstring strength and flexibility are both associated with an increased risk of hamstring tendinopathy (Cejudo et al., 2015). To identify the potential risks of hamstring tendinopathy, I will lead the muscle fitness tests pre and post-exercise training program and execute the exercise program for all participants. In addition, I will interpret the test results for each participant based on the norms. Baseline test protocols include assessing the client's range of motion and strength of the hamstring prior to the exercise program intervention. Exercise

program is consist of novel stretch and progressive loading exercise training for 8 weeks. I will perform final fitness assessment for each participant after they complete the program. I will apply what I learned from *KINE 480-Exercise Testing and Prescription* to this study. Specifically, I will apply exercise training principles such as overload, progressive, individuality, specificity and diminish return into this program. I will include FITT-VP (Frequency, Intensity, Time, TypeVolume Progression) in their training. I will apply my pre-exercise health screening skills to each participant before any exercise test. Fortunately, our lab has already provided the most expensive equipment (Biodex System-4) for the muscle function test. I am seeking additional funding from the SARC award to purchase an inclinometer device and free weights necessary to measure flexibility (i.e., range of motion) to execute my loading program. This research has not been approved by IRB yet but Dr. Feng he will help submit the IRB proposal and I will get the IRB training once this proposal is awarded.

I have been participating in research with Dr. Feng He and have focused my college career on improving the health of athletic and non-athletic populations through fitness. I feel confident in my ability to perform the progressive loading program for college students who may be at risk for proximal hamstring tendinopathy. Below is my estimated budget for funding both the inclinometer and exercise equipment.

C. Itemized and Detailed Budget

Instruments required for program	**Cost**
Primary Inclinometer- Jtech Medical, 9CM113	……..……...$680.00
Exercise Matts	….……..$74.93
Free weights (dumbell, barbell)	……..……..$49.25
Resistance Bands	……...$25.82

Program Advertizement	…….……..$20.00

Total SARC Funding Amount……...$ 850.00

D. Broader Impact of the Work

When proven successful, this program will increase fitness awareness on campus and beyond. The knowledge and experience Chico State Students will gain via participating in this project will carry on for the rest of their lives. Starting with a program that focuses on the improvement of hamstring function will decrease the risk of future injuries for both active and inactive populations.

E. Expected Benefits to Student

After graduating from Chico State with a bachelor's in Exercise Physiology, I plan to pursue my medical degree at UC Davis. I have been preparing for my MCAT, participating in research, and gathering experience outside of school as a certified scrub tech in the OR. A spotlight criterion for UC Davis medical program is research and creativity. Executing my program would fulfill this category excellently. I will gain my first research experience in all different perspectives such as literature review, critical thinking, research design, data analysis and manuscript writing. I will also learn how to operate new lab equipment which is widely used in rehabilitation programs under the supervision of Dr. Feng He. I plan to present my project at ACSM 70th annual meeting next June at Denver, Colorado. If this new exercise program significantly improves hamstring muscle function, it could potentially decrease the risk of tendinopathy. Once achieved, this exercise program will fulfill my utmost goal of helping people improve their health.

Bibliography

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to SARC committee,

It's my great pleasure to write Gretchen Cassing a letter of recommendation for SARC application. I have known Gretchen approximately one and half years ago when she was my student in *KINE 323 Physiology of Exercise.* Currently she is taking *KINE 480 Exercise Testing and Prescription.* She reached out to me last year and asked me if there was any research opportunity that she can participate. We meet weekly for assisting her to develop potential research project. I play a role as her research advisor. Gretchen is ambitious, highly motivated, and always on time. She is currently preparing for the Medical College Admission Test. Her goal is to be accepted by UC-Davis Medical School. The project that she is working on now is to develop an evidence-based novel exercise program including stretching and progressive loading to improve hamstring muscle function. The impact of research experience by taking initiative to design the exercise training program and execute it in a clinical setting is substantial. She will be trained under the guidance of me with all the perspectives of the research such as how to read peer-reviewed paper, how to ask right questions, understand the important components of research methods, how to write IRB proposal following IRB training, how to collect data in a professional setting, how to write a research proposal, familiar with different data analysis tools, and how to operate

new lab equipment. She is expected to present her research at the national conference, 70th ACSM annual meeting at the beginning of June 2023 in Denver.

Gretchen has the experience of working with patients in the clinical setting. She is a great communicator with great passion and positive attitude. Although her current GPA is not meet the minimum requirement now (0.05 below the requirement) due to the paradise fire and Covid pandemic. She should be able to catch up her grade in the next two semesters. If the proposal is awarded, the research experience she gains will benefit her tremendously for her further pursuing medical degree because critical thinking, human communication skill, writing and presentation are essential for the medical field as well.

Gretchen will be equipped with the knowledge and skill to design and execute the research project after her completion of course of *KINE480 exercise testing and prescription* this semester. Our lab also provides the major equipment (Biodex System-4) support for her project. In addition, I will always be there for her if she needs anything. KINE207 as a supervised on-campus research one-onone course allows us to meeting weekly to develop her research ability to carry out this project. I believe her mature demeaner, strong communication skills, clinical experience, and perseverance prepare her well to accomplish this project. Please feel free to contact me at 530-228-6374 if you have further questions. Thank you for your consideration.

Feng He, PhD
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Gretchen Cassing

GPA Narrative

I was a senior at Paradise High School when the Camp Fire in 2019 happened. During the fall and spring semesters of my first and second years in college, I struggled to find a home. I relocated numerous times, resulting in a commute of no less than one hour to and from school. My records show a drop in grade point average during my time of struggle, but more importantly, they show perseverance. Since then, my GPA has traveled in an upward linear direction. I haven't given up on my goals, I hustle every day to grow as a student, and despite what happened in Paradise to my community and myself, I am not going to let it affect my future opportunities.