Executive Summary
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Tactile feedback for quality posture and breathing during movement

There is a serious rise in the epidemic of non-impact injuries in this country, such as low back and neck pain. According to the Agency of Healthcare Research and Quality (AHRQ), about 60-80% of us will get at least mild back pain at some point in our lives. AHRQ said that in 2007 about 27 million US adults aged 18 or older, reported having back pain. The American Pain Foundation confirms this by stating that back pain is the main cause of disability amongst Americans under the age of 45. Additionally, AHRQ found that collective costs for back pain have more than doubled since 2004. A survey conducted by the Journal of American Medical Association specifically found that total expenditures for neck and back care increased by 65% between 1997-2005 to about $86 billion a year. To make this even more interesting, researchers from the University of Washington, Seattle, found that the nation's dramatic rise in expenses for the diagnosis and treatment of back & neck problems has not led to a proportional improvement in patient health or function. On the contrary, patients actually reported more disability from back and neck pain, including more depression and physical limitations while we spend more money in efforts to remedy the problem. We need to take a more active approach to fight this epidemic rise of non-impact injuries to bring the American people back to function and proportionally reduce the health care expense associated with these injuries.

So where is all this money going? Researchers suggest that medications top the lists, followed by office visits. We could also argue that diagnostic imagining, injections, and surgeries are runner ups in that list. The aforementioned medical remedies can be considered passive fixations, meaning the patients have minimal active participation in managing their own back pain. This is unfortunate since the medical research provides strong evidence that the majority of back pain is not due to severe injury or severe illness but can be attributed back to poor posture and general inactivity. We would argue that poor activity/exercise choices perpetuate poor movement behavioral patterns which ultimately contribute to the epidemic of back and neck pain, despite an effort to stay active and avoid disability!

From a conservative medical remedy stand point, movement professionals such as certain Physical Therapists, Chiropractors, Athletic Trainers, and Strength coaches are fighting this epidemic with a more active approach by empowering people to clean up poor movement behavioral patterns. The current evidence and cutting edge rehabilitation approaches highlight the necessity of two fundamental variables of human function. One is proper spinal alignment (from head to low back) which creates a platform for the second variable that is, proper breathing mechanics. Remediating these two variables has been the foundation of successful rehab approaches which restore optimal painless function. Our team has developed an innovative product that demands patients/clients to bring their attention to proper spinal alignment and breathing mechanics, which no other product on the market provides. The product consists of a carefully engineered collapsible dowel with a slot to accommodate two elastic Velcro breathing straps that wrap around the upper and lower abdomen to attach the dowel to the patient's spine while providing tactile cues for proper breathing mechanics and spinal alignment simultaneously.

Currently movement professionals typically resort to verbal cues or manual cues to remediate poor movement behavioral patterns that patients/clients demonstrate (poor spinal alignment/breathing mechanics). Despite our best efforts, we still often see disconnect between how the professional would like the patient/client to move and how they actually move. Unfortunately, we often lower our standard for movement quality to simply avoid frustrating our patients/clients, given that we have limited time to get them to move how we'd like them to. Our product helps to minimize the need for verbal cues by providing real time kinesthetic feedback that verbal cues could never live up to. This also minimizes the frustration level of both the trainer and trainee because correct spinal alignment and breathing mechanics is something they can now FEEL and is something that is now REAL to them. The movement professional can now focus on other aspect of the patient/client's poor alignment, which frees their hands for other body parts that may need manual cueing. Both the professional's and patient/client's time is now more effective and productive during treatment or training while setting a higher standard for movement

quality. This product gives us a better way to simultaneously control the essential variables (proper spinal alignment and breathing mechanics) of authentic human movement, which becomes an extremely powerful tool not only in rehabilitation but also in injury prevention within the fitness and wellness realm.

Team member Connor Ryan and I, Ramez Antoun (team leader), are the founders of the UMass Lowell Chapter of Rehab 2 Performance club (R2P), which is the student branch of an internationally recognized organization titled "International Society of Clinical Rehab Specialists". This organization is creating a rapidly growing network of clinicians, scientists, and exercise professionals as a means to encourage health, disability management, and injury prevention worldwide. I, Ramez Antoun, have been recruited to be on the Committee Board of the R2P Organization where I mentor other Physical therapy students around the country interested in starting the club at their respective universities. Connor and I are scheduled to graduate with a Doctorate in Physical Therapy from UMass Lowell on May 18th, 2013. We both have also received a Bachelor's in Exercise Physiology from UML back in 2010 and both have been deeply involved with both strength and conditioning and rehabilitation throughout our undergraduate and graduate careers. This product will continuously grow and develop alongside our passionate pursuit and life long journey of perfecting our craft of taking people out of pain/disability, bringing them to and keeping them at a level of function they never thought possible.

Resources

Knowledge: our five member management team is comprised of experienced individuals in physical therapy, engineering, finance, and creative design. The unique composition of this team covers all the bases required to achieve the successful product development and growth.

Human resources: Our network is extensive on both a national and international level since I am a board member of the Rehab 2 Performance committee as well as Connor being actively involved with Rehab/performance facilities around New England. We also have the support of the owner of Central Mass Physical Therapy and Wellness (Michael Roberts). Our target market will first be movement professionals consisting of ~600,000 professionals in 2013 and estimated to be ~700,000 professionals by the year 2020 according to the U.S Bureau of Labor. We have a solid management team in place. As we ramp up operations, we will likely outsource raw material production to a third party manufacturer (e.g. cutting slots in the PVC pipe) and hire a few internal employees for assembly and packaging. For the beginning stages of the company, our current management will cover assembly to maintain quality, but as we grow, it is necessary to find employees that place a high emphasis on quality, an important aspect to our product and our image.

Physical: As we ramp up, we will need a workplace for product assembly and inventory storage.

Financial: we will need funding (~$25,000; see chart on pg. 3 for breakdown) to a number of initial investments, including the formation of the LLC, trademarks for the product name and company name, patent search, patent application, up-front tooling investment paid to the manufacturer, raw material inventory build-up, and advertising to introduce the product to our target market (movement professionals). Financial funding will come from equity investments by the management team as well as funding from UMass Lowell.

Road Map: We have completed the final prototype. As we already have a patent pending on the product, the next step is to trademark the name of the product and produce a small batch of units to use introduce it to our target market, that is Movement professionals. This will include some light advertising as well. The next steps include the full patent search and patent application. Simultaneously, we will continue the LLC formation process and apply for a trademark for our company name. To begin ramping up production we will invest in tooling with a manufacturer to cut the PVC pipe and attach the collapsible button. We will then stock up on the necessary inventory to begin a steady flow of production to match demand.

The largest risk will be the price negotiations with manufacturers and the ability to hire quality workers for assembly. We will face the first risk by receiving price quotes from a number of manufacturers and selecting the one that provides the best value, keeping the quality of the work in mind. In addition, the manufacturer must have the additional capacity to grow along with us as we believe the demand for this product will outpace production in the initial stages. Also, for the beginning stages of the company, our

current management will cover assembly to maintain quality, but as we grow, it is necessary to find employees that place a high emphasis on quality, an important aspect to our product and our image

Uses for Funding

Sources		Uses	
UMass Grant	$ 25,000	LLC Formation (remaining 1/3rd of cost)	106
		Trademark Product Name	325
		Trademark Company Name	325
		Patent Attorney & Application Fees	10,000
		Tooling	6,000
		Inventory	3,000
		Advertising	5,244
		Total	$ 25,000