Genius 4 Kids
Pediatric Fitness Center

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Universal Exercise Unit (UEU)

I. The History of Universal Exercise Unit (UEU):

The Universal Exercise Unit was designed and developed in the 1940s by a well-known orthopedic surgeon, Professor Dega, in Poland. The concept of using Universal Exercise Unit (UEU) was quite simple at that time: **to strengthen weak muscles**. Therefore, the main goal was to train weak single muscles or muscle groups to improve muscle strength and endurance. In Poland, Universal Exercise Unit (UEU) manipulation has become part of the Physical Therapist curriculum in school. Nowadays, the physical therapists in Poland generally apply this greatest invention in Orthopedic Rehabilitation, Neurological Rehabilitation, Sports Medicine Rehabilitation, Pediatric Rehabilitation, and other physical therapy rehabilitation as a treatment and training equipment. In Poland, even a small setting such as private physical therapy clinics or well-established facilities such as physical therapy departments in the medical centers are all equipped with UEU. Gradually, the UEU has become the greatest invention and contribution in the history of European Rehabilitation Medicine.

In 1999, a trained Poland physical therapist couple, Richard and Izabela Koscienlny-parents of a disabled child, first introduced the "Adeli Suit", "Universal Exercise Unit", and the "Intensive Training Program" in pediatric physical therapy rehabilitation in the United States. This combination has become a new and effective training strategy and treatment milestone in pediatric physical therapy and exercise training in Rehabilitation Medicine.

II. The Concepts of Universal Exercise Unit (UEU):

In the 1940s, Professor Dega's concept of using the Universal Exercise Unit (UEU) was quite simple: to strengthen weak muscle. Some patients with weaker muscles cannot effectively contract their weak muscles, nor can they move their limbs with normal pattern under influence of normal gravity and muscle tone. By suspending the target limbs in the UEU to eliminate gravity force and to reduce the weight of target limb, the target limb begins to gradually initiate, develop, and learn the new movement. Eliminating the gravity in the UEU makes the strengthening exercise easier than the traditional exercises. It also allows for isolating the desired muscle group in the UEU. The UEU also provides the proper *assistance and resistance* for weak muscles or muscle groups in the completion of the full movement. It improves muscle strength and muscle endurance, enhances the single movement or the movement pattern learning, and promotes and accelerates functional skills learning and development. As a result, the Universal Exercise Unit has become the most effective exercise device in muscle strengthening, and in dynamic movement or functional skill training.

III. The Components of the Universal Exercise Unit (UEU):

Universal Exercise Unit (UEU) can be utilized in two different ways: 1) Pulley System with Suspensions. 2) Suspension System (called "Spider Cage").

1. **System of pulleys** and suspensions using treatment bed or chair.

2. **Suspension system** (called "Spider cage") using the belt an elastic cords

1. Pulley System:

It consists of basic pulley systems, suspension cords, suspension harness for different body parts, and sand bags with different weights (graded every ½ lb or 1 lb). The goals of this UEU pulley system are to improve the passive/active range of joint motion, to improve the muscle flexibility, to promote muscle strength and muscle endurance without the influence of associated movement, and to enhance dynamic movement or functional skill training. If a person with neurological disorder is asked to do a certain

movement, he/she will perform the requested movement by moving both upper and lower extremities at the same time (associated movement) because of the influence of abnormal muscle tone, lack of muscle strength, and insufficient graded control of balance and coordination. By eliminating the gravity force in the UEU along with custom-designed exercise training programs, the trainer can isolate and train the target weak muscle or muscle group. Patients also can perform the movement pattern by following movement with the trainer (***passive range of motion exercise***), and initiate the movement with lateral assistance and even perform a minimum movement with assistance (***active-assistive range of motion exercise***). After that, they can progress to participate resistive muscle strengthening exercise training (***active–resistive exercise***). On the other hand, the progress will be reflected in functional gains, especially in graded control of active movement, quality control of balance and coordination in postures, transitions, locomotion and gait. This is a very crucial exercise principle of using the UEU to train or treat patients with neuromuscular disorders or even with orthopedic-related muscular-skeletal dysfunction.

2. Suspension System:

The UEU can also be combined with belt and elastic cords and can be used in many other ways as a dynamic suspension (called "Spider Cage"). The patient is suspended in the middle of the UEU with unique support received from the elastic cords acting as extra hands. This suspension system-"Spider Cage" provides horizontal, vertical, and even dynamic features of functional suspension as a support, assistance, or even resistance during training. The suspension system also provides just the right amount of support needed for securing and balancing patient in the UEU while practicing or performing needed movements, transitions (side-sitting to quadruped position, side-sitting to kneeling, kneeling to standing via a half-kneeling, sitting to standing, and squatting to standing), or functional skill in different developmental positions (sitting, crawling/creeping, standing, walking, jumping, hopping, etc.) on their own, as well as strengthening muscle, enhancing balance and coordination training. In Spider Cage with full suspension, the patient is able to accomplish movements or activities in an upright position which have never been able to do or have never dreamed to do. Depending on the progress he/she makes, the trainer can change the location and direction of the elastic cords attachment on the UEU, or can even change the patient's position (moving a little bite forward or backward, moving a little bite to his/her right or left- even thought just 1-2 inches) in the UEU to reduce the amount of assistance and resistance or increase the amount of bearing weight until the patient can complete the requested tasks independently. The other benefits of the Spider Cage are to provide body awareness and vestibular stimulations, to promote or develop postural reflexes (protective extension reactions, righting or equilibrium reactions), to provide sensory-motor integration, and to promote independence in graded control in movements and functional skills.

IV. The Optional Equipments for the Universal Exercise Unit (UEU):

Universal Exercise Unit (UEU) is extremely helpful while working on specific goals like endurance for a certain skill. It also can be utilized in different functional training with different optional equipments: **1)** ***Tracking Rail***. **2)** ***Parallel Bars***.

1. Tracking Rail:

With the use of the tracking rail, the patient can practice not only ambulation but also working on 1) promoting/improving the quality of movement and endurance in different upright positions or transition training (creeping, kneel-walking, kneeling to standing via a half-kneeling, sitting to standing and walking), 2) enhancing the graded movement control in balance and coordination (for example: promoting reciprocal movement of upper or lower extremities). The tracking rail is very helpful as an ambulatory training device, and can also be used as a dynamic stander. Patients learn the concept of weight bearing on the lower extremities in standing and weight shifting from side to side or forward and backward (as a pre-ambulation training) along with the consequences in a safe way. He/ she also loves to "fly" and "spin" as a different use with training rail.

2. Parallel Bar:

Parallel bars, installed inside the UEU, allow the trainer to combine any of the previously mentioned concepts for gait training, functional skill training and transfer training. The parallel bars can also be done either independently or with the use of the "Spider", tracking rail.

The Universal Exercise Unit (UEU) meets all the requirements of FDA regulations and is FDA listed and registered. There is no age limit to use UEU. The weight limit is 350 pounds. Although the clinical concept of UEU seems to be very simple, professional certified training is required to ensure the safety of the patient.