500 on the arm and since the filaments are arranged on a bias, the sleeve can support the muscles and ligaments of the joint in resisting rotation of the limb elements and articulation of the elbow.

[**0064**] While the exemplary braces **80** and **500** are appropriate for application to the knee and elbow, respectively, the adjustable bracing system may be applied to many of the body's joints. For example, a back brace adjustable to accommodate motions specific to the vertebrae may be used for injury protection, rehabilitation, and strength augmentation of the lumbar and thoracic vertebrae. Likewise, the adjustable orthotic brace system can be applied to the hand, finger, wrist, shoulder, and hip. For example, a partial shirt having a sleeve extending over the proximal humerus and encircling the upper torso or the shoulder from the supraclavicular region to the axilla and constructed of neoprene and an electroactive mesh may be used to treat the shoulder. Similarly, a glove or individual finger sleeve including an electroactive mesh can be used to adjustably brace the joints of the fingers and hand. The adjustable brace system may also be applied to foot and ankle braces and built into a shoe to prevent foot or ankle injury or to aide in strengthening or rehabilitation of a foot or an ankle.

[**0065**] The adjustable brace facilitates a method of supporting a joint that is useful in protecting the joint from injury and in treating injury and deformity through physical therapy and strength augmentation. The joint is supported by binding the levers **86** and **88** of the bracing element **84** to elements of the limb on each side of the joint and altering a characteristic of the bracing element **84** or one of the bindings in response to a requirement of a treatment regimen or a sensed bracing parameter resulting from the joint's movement. The force binding the limb to the bracing element **84** can be varied to adjust the brace for changes in the dimensions and density of muscles during joint operation or to vary the compartmental loading of the joint. The shape of the brace can be altered to vary the compartmental loading and to treat certain joint conditions. In addition, a force can be applied to resist or assist articulation of the joint to either strengthen the muscles of the limb or aid limb function with weakened muscles.

[**0066**] Referring to **FIG. 13**, a circumferential band **500** at least partially surrounding the leg or ankle of the user constricts to bind the shoe to the leg/ankle/foot when a sufficient force threatens to potentially injure the ankle. To detect this force strain detecting devices **510**, such as strain gages, may be located within the shoe. One or more dynamic materials **520** may likewise be located within the shoe to provide a counteracting force(s) to the detected force. For example, the dynamic material **520** may be an electroactive polymer that stabilizes the ankle, such as by applying counteracting forces. While one or more of these materials are supported within the shoe of the user, all of the aforementioned embodiments may likewise be included. The bands **500** may be detachably attachable to the leg/ankle/foot and/or the shoe, as desired. In addition, these features may likewise be incorporated in a sleeve that fits over the foot and/or ankle.

[**0067**] The detailed description, above, sets forth numerous specific details to provide a thorough understanding of the present invention. However, those skilled in the art will appreciate that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuitry have not been described in detail to avoid obscuring the present invention.

[**0068**] All the references cited herein are incorporated by reference.

[**0069**] The terms and expressions that have been employed in the foregoing specification are used as terms of description and not of limitation, and there is no intention, in the use of such terms and expressions, of excluding equivalents of the features shown and described or portions thereof, it being recognized that the scope of the invention is defined and limited only by the claims that follow.

I/We claim:

1. An adjustable Orthotic bracing system comprising:

(a) a bracing element including a first lever hinged to a second lever;

(b) an attaching element restraining said bracing element to a limb;

(c) a loading transducer altering at least one of said bracing element and said attaching element in response to a fist signal;

(d) a program for a data processing device including a program instruction; and

(e) a data processing device outputting said first signal to said loading transducer in response to said program instruction.

2. The system of claim 1 wherein said loading transducer altering at least one of said bracing element and said attaching element in response to a first signal comprises a transducer arranged for substantially rotating said first lever and said hinged second lever of said bracing element.

3. The system of claim 2 wherein said transducer comprises a pneumatic actuator connected to said first and said second levers.

4. The system of claim 3 wherein a rate of actuation of said pneumatic actuator is responsive to said first signal.

5. The system of claim 2 wherein said transducer comprises a hydraulic actuator connected to said first and said second levers.

6. The system of claim 5 wherein a rate of actuation of said hydraulic actuator is responsive to said first signal.

7. The system of claim 2 wherein said transducer comprises a motor having an output alterable in response to said first signal.

8. The system of claim 2 wherein said transducer includes a rheological fluid having a flow characteristic responsive to said first signal.

9. The system of claim 2 wherein said transducer comprises a polymer-metal composite element connected to said first and said second levers.

10. The system of claim 1 wherein said transducer comprises a polymer-metal composite element having an electrical characteristic responsive to a change in a dimension, said polymer-metal composite element being connected to said first and said second levers such that relative rotation of said first and said second levers will change said dimension.

11. A method of supporting a joint of a limb comprising the steps of

(a) binding a first lever to a first element of said limb;