along a portion of the foot to measure the bending of the foot. Based on certain ranges, the data collected from the sensor (or sensors) may by used, for instance, by a trained prosthetist to detect the occurrence or pattern of successive heel strikes and/or toe loads on the prosthetic foot. This data may be used, for example, to align (either statically or dynamically) or to select an appropriate prosthetic foot. In addition, it may also be used to predict and to prevent potential failure of the device, as well as other potential safety hazards. Moreover, it may further be used to train users of prosthetic devices to recognize and to associate the detected gait dynamics with the associated pressures caused by the wearing of the device. Although the attached drawings and the description below often describe the invention in terms of a prosthetic foot, the invention is not limited to this application. Embodiments of the invention may include applications to many different prosthetic and orthotic devices, such as, but not limited to, torsos, arms, necks, legs, hands, etc. Additionally, embodiments of the invention may include applications to other devices associated with limbs, such as, for instance, clothing articles (e.g., shoes) and sporting goods equipment (e.g., ski boots).

[0013] One embodiment of the invention includes a system for measuring performance of an orthotic or prosthetic device, comprising an orthotic or prosthetic device, the device capable of bending while in use, and a sensor, wherein the sensor is configured to bend with the device while in use, and wherein the sensor produces a resistance output correlated to the bending of the device. Another embodiment of the invention includes a method for measuring bending of an orthotic or prosthetic device associated with a limb, comprising providing an orthotic or prosthetic device having at least one sensor associated therewith, measuring with said sensor the bending of the sensor while the device is in use, said sensor bending with the device, and communicating information regarding said bending. Another embodiment of the invention includes a system for measuring performance of a device associated with a lower limb, comprising a device associated with a lower limb, the device capable of bending while in use, and a sensor, wherein the sensor is configured to bend with the device while in use, and wherein the sensor produces a resistance output correlated to the bending of the device. Yet another embodiment includes a prosthetic foot system, comprising a prosthetic foot, at least one sensor comprising a resistive strip provided along a portion of the prosthetic foot, the resistive strip configured to bend with the prosthetic foot while the foot is in use, and means for communicating bending information measured by said sensor to an individual.

[0014] One embodiment of the invention includes a method of gathering information regarding a prosthetic foot, comprising providing a prosthetic foot having at least one sensor associated therewith, measuring with said sensor a performance characteristic of said device while in use, and storing data corresponding to performance characteristics measured by said sensor within a memory. Another embodiment of the invention includes a method of gathering information regarding a device associated with a limb, comprising providing a device associated with a limb having at least one sensor associated therewith, measuring with said sensor a toe load value and heel strike value of said device while in use, and determining whether the at least one of said toe load value and heel strike value falls within a predetermined range indicative of different states of a user's gait. Another embodiment of the invention includes a method for assessing whether a device associated with a limb is in a suitable working condition, comprising providing a device associated with a limb having at least one sensor associated therewith, measuring with said sensor a biomechanical characteristic of said device while in use, communicating information from said sensor to a processor, and processing said information to determine whether said device is or is not in a suitable working condition, and providing a signal indicating whether said device is or is not in a suitable working condition. Another embodiment of the invention includes a device for attachment to a limb, comprising at least one sensor associated with the device configured to measure biomechanical characteristic of said device while in use, a processor configured to process information selected from the sensor to determine whether said device satisfies a desired condition selected from the group consisting of: alignment, safety, and failure, and a user interface indicating whether said device satisfies the condition. Yet another embodiment includes a prosthetic foot system, comprising a prosthetic foot, at least one sensor provided on the prosthetic foot configured to measure a performance characteristic of said foot while in use, and a memory storing information gathered by said sensor to compile a history of the performance characteristic of said foot while in use.

[0015] One embodiment of the invention includes a method of providing information regarding a prosthetic foot, comprising providing a prosthetic foot having at least one sensor associated therewith, measuring with said sensor a force characteristic of said device while in use, and outputting to an individual information auditorily or visually corresponding to the force characteristic. Another embodiment of the invention includes a system for measuring performance of a prosthetic foot, comprising a prosthetic foot, a sensor on the device configured to measure a force characteristic of the device, and a user interface providing audio or visual information relating to the force characteristic measured. Another embodiment of the invention includes a method of providing information to a user of a device associated with a limb, comprising providing a device associated with a limb having at least one sensor associated therewith, measuring with said sensor a load characteristic of said device while in use, and transmitting information relating to the load characteristic to the user of the device through sound.

[0016] One embodiment of the invention includes a method of determining activity of a device associated with a limb of a user. The method comprises in one embodiment: calculating a step factor based on the number of steps taken by the user over a period of time using at least one sensor provided on the device; calculating an impact level factor of the device using the at least one sensor, the impact level being determined by measuring a toe load and/or heel load of the user over the time period and comparing the measured toe or heel load to a predetermined threshold value (e.g., threshold toe load or threshold heel load) to determine if the threshold value is exceeded; and determining an activity index value for the user based on the step factor and the impact level factor.