

CLAIMS

1. A gait analysis system comprising:
instrumented footwear including one or more mobile sensors;
a processor; and
a computer-readable data storage device storing program instructions that, when executed by the processor, control the system to:
 - determine, using the instrumented footwear, gait information of a user performing a test routine;
 - determine a plurality of gait parameters based on the gait information;
 - determine gait symmetry of the user based on the plurality of gait parameters;
 - determine a gait signature of the user based on the plurality of gait parameters;and
determine a treatment effect based on the gait signature.
2. The gait analysis system of claim 1, wherein the one or more mobile sensors include a plurality of force transducers and a multi-axis accelerometer.
3. The gait analysis system of claim 1, wherein the plurality of gait parameters include gait lines and deviations from the gait lines.
4. The gait analysis system of claim 1, wherein the plurality of gait parameters include:
a first peak ground reaction force representing an occurrence of a heel strike component of a stride of the user;

a local minimum force representing an occurrence of a terminal stance component of the stride of the user; and

a second peak ground reaction force representing an occurrence of a pre-swing component of the stride of the user.

5. The gait analysis system of claim 1, wherein determining the plurality of gait parameters includes integrating the plurality of gait parameters determined over a distance of the test routine.

6. The gait analysis system of claim 5, wherein determining the plurality of gait parameters includes determining components of a stride of the user during the test routine.

7. The gait analysis system of claim 6, wherein determining the plurality of gait parameters includes determining respective gait speed levels of the components of the stride of the user.

8. The gait analysis system of claim 7, wherein determining the respective gait speed levels comprises selecting the respective gait speed levels from a set comprising: a slow speed level, a normal speed level, and a fast speed level.

9. The gait analysis system of claim 8, wherein determining the gait parameters includes combining the plurality of gait parameters based on the respective gait speed levels of the plurality of gait parameters.

10. A method for gait analysis using instrumented footwear, the method comprising:
determining gait information of a user performing a test routine based on gate data received from instrumented footwear;
determining a plurality of gait parameters based on the gait information;
determining gait symmetry of the user based on the plurality of gait parameters;
determining a gait signature of the user based on the plurality of gait parameters; and
determining a treatment effect based on the gait signature.

11. The method of claim 10, wherein determining the gait information comprises receiving the gait data from a plurality of force transducers and a multi-axis accelerometer included in the footwear.

12. The method of claim 10, wherein the plurality of gait parameters include gait lines and deviations from the gait lines.

13. The method of claim 10, wherein the plurality of gait parameters include:
a first peak ground reaction force representing an occurrence of a heel strike component of a stride of the user;
a local minimum force representing an occurrence of a terminal stance component of the stride of the user; and
a second peak ground reaction force representing an occurrence of a pre-swing component of the stride of the user.

14. The method of claim 10, wherein determining the plurality of gait parameters includes integrating the plurality of gait parameters determined over a distance of the test routine.

15. The method of claim 14, wherein determining the plurality of gait parameters includes determining components of a stride of the user during the test routine.

16. The method of claim 15, wherein determining the plurality of gait parameters includes determining respective gait speed levels of the components of the stride of the user.

17. The method of claim 16, wherein determining the respective gait speed levels comprises selecting the respective gait speed levels from a set comprising: a slow speed level, a normal speed level, and a fast speed level.

18. The method of claim 17, wherein determining the gait parameters includes combining the plurality of gait parameters based on the respective gait speed levels of the plurality of gait parameters.

19. A computer program product comprising a computer-readable data storage device storing program instructions that, when executed by computer processor, cause a gait analysis system to perform operations comprising:

determining gait information of a user performing a test routine based on gate data received from instrumented footwear;

determining a plurality of gait parameters based on the gait information;

determining gait symmetry of the user based on the plurality of gait parameters;
determining a gait signature of the user based on the plurality of gait parameters; and
determining a treatment effect based on the gait signature.

20. The computer program product of claim 19, wherein determining the plurality of gait parameters comprises:

determining components of a stride of the user during the test routine;
determining respective gait speed levels of the components of the stride of the user from a set comprising: a slow speed level, a normal speed level, and a fast speed level; and
combining the plurality of gait parameters based on the respective gait speed levels of the plurality of gait parameters.