S2 Table - Gait analysis studies extract

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| **Paper** | **Subjects** | **Walking speed** | **Marker set** | **Parameters** | **Comparisons** |
| [17] | Patients who underwent knee or ankle joint surgery (Average 53.2 years, 154.8 cm, and 59.3 kg). | Self-paced walking speed, 3 times 5 m walking path | Custom markerset with markers on: LASI, RASI, LPSI, RPSI, RTHI, LTHI, RKNE, LKNE, RTIB, LTIB, RANK, LANK, RTOE, LTOE, RHEE, and LHEE | Flexion/extension angles of the hips, knees, and ankle joints | Patients with and without a temporomandibular joint exerciser compared to healthy reference |
| [31] | Twenty participants with chronic ankle instability and 15 uninjured control participants (age 24.8 (8.8) and 24.5 (7.7) years, BMI 23.7 (4.1) and 21.9 (2.0) kg/m2 | Treadmill walking at 4.6 km/h | n/a | Pelvic, hip, knee and ankle kinematics | Participants with chronic ankle instability compared to healthy control group |
| [32] | 9 typical developing children (10.4±3.3 yrs, 35.0±11.7 kg) and 8 children with cerebral palsy (9.5±3.0 yrs, 32.9±11.5 kg) | Self-selected walking speed | n/a | Gait profile scores and movement analysis profile scores | Children with cerebral palsy and healthy control group |
| [33] | Twenty healthy participants (age: 39 (9) years, height: 64.8 (4.4) inches, weight: 174.2 (37.2) pounds) | 5 feet walking area before and after a two step up-and down stairs | OptiTrack 41-marker set on a motion tracking suit | Ascent and descent walking speed; step width; toe and heel clearances for ascent and descent, respectively; and toe and heel placement relative to the stair face for ascent and descent, respectively | Series of walking trials involving a step-deck obstacle, consisting of 3 texting trials and 3 non-texting trials on a mobile device |
| [34] | Ten healthy (between 28 and 68 years) and ten brain-damaged patients (between 28 and 70 years) | Walking towards a ground marking with normal visual and blindfolded | Single markers on the shoulders and heels and third toes. | The number, length and stance duration of steps and whole body trajectory | Compare the navigational components of spatially oriented locomotion between healthy and brain-damaged participants. |
| [19] | 14 asymptomatic participants (22.3 (2.3) years, 173 (13) cm, 68.9 (14.1) kg). | Running in 4 conditions:  neutral without shoes, with custom and with fabricated foot orthoses and with stability shoes | Custom tracking marker sets with six degrees of freedom on pelvis, thigh, lower leg and foot-shoe complex | Knee peak angles and ranges of motions | Compare the parameters in the four shoe conditions. |
| [20] | Bilateral transfemoral amputee subject with powered prostheses (38 years, 70 kg. | Comfortable self-paced walking speed | Full skeletal marker set | Sagittal joint angles were extracted for the hip, knee, and ankle joints for each limb | Gait compared with passive and with the proposed active prosthesis |
| [21] | 111 long-distance runners. | 10 walking trials and 10 running trials at a constant velocity (9.5 km/h to 10.5 km/h) | Leardini’s protocol [98] | Net moments in the sagittal and frontal planes of the ankle and knee joints, ankle and knee angles and range of motion | Study the effect of an exercise protocol designed for the foot-ankle complex on running related injuries. |
| [35] | Seven healthy adult males (age 33.4 ± 8.5 years, body mass  80.1 ± 11.6 kg and height 180.6 ± 5.3 cm) | Slow walking (0.85 m/s) | Medial malleoli, 1st metatarsal joint and 4th metatarsal joint | Step lengths, steps widths and step times | Investigate the interplay between the COP and COM in sagittal and frontal directions following lateral pushes delivered at pelvis level |
| [22] | n/a | Self-paced walking speed | Great trochanter region, femoral lateral epicondyle, tuberosity of the tibia, and the centre of the anterior region of ankle joint | Spatial position of markers, acceleration, and ground reaction force by force plate | Method presented to determine cartilage stress distribution |
| [23] | Ten healthy participants (38 (7.7) years, 167 (12.2) cm). | Walking at a natural pace along a 10 meter hallway with varying stride lengths on command | n/a | Horizontal foot movement, stride length | Compare OptiTrack’s stride length readings of footprints created by whiteboard marker fixed to the heel |
| [24] | Single healthy subject (24 years, 100 kg, 185 cm). | Treadmill walking at 0.67 m/s for 3 minutes without and with exoskeleton, without and with active compensation of passive dynamics | n/a | Hip and knee angle | Compare joint trajectories in exoskeleton conditions |
| [25] | 15 patients with hip osteoarthritis who underwent total hip arthroplasty, including seven patients with anterolateral approach, and eight with direct lateral approach. | Self-paced 6 meter normal walk | Inferior ischial tuberosity, inferior greater trochanter, and central posterior femur | Walking velocity and stride length as spatiotemporal scales, hip joint ROM in the sagittal plane, locomotion range of the trunk, and pelvis inclination in the frontal plane | Compare the effect of an anterolateral approach in the supine position with that of a direct lateral approach on gait motion |
| [36] | Twenty healthy subjects, aged 23.6 (3.41), body mass index 22.23 (2.3) | Self-selected comfortable walking speed while turning in a 2.75 m radius turn | Lateral malleolus, lateral epicondyle of the femur, anterior superior iliac spine, suprasternal notch, acromion, heel, the tip of the toe, and at the 1st and 5th metatarsals, centre of the forehead, above the right ear, and centre top of the head | Stride length, average velocity and inclination of the trunk, and the minimum, maximum and range of motion of the ankle, knee and hip joint angles | Locomotion pattern and foot pressure adjustments during turning |
| [18,40] | Patients with diabetic polineuropathy. | 10 m flat walkway at a self-selected cadence | Standard Cleveland Clinic marker set | Joint angles and net ankle moments in the sagittal and frontal planes; step length and duration | Study the effect of a physiotherapy intervention compared to a control group |
| [26] | Below-knee amputee male (44 years, 85.7 kg). | 0.98, 1.13, and 1.35 m/s for slow, self- selected, and fast cadence trials, 90 seconds walking | Full skeletal marker set (similar to the Helen Hayes marker set) consisting of thirty-four reflective markers | Lower limb sagittal joint angles | Compare healthy gait with the amputee’s gait with passive and the proposed active prosthetic device |
| [27] | Forty-five patients classified into severity degrees of diabetic neuropathy: absent (n = 11), mild (n = 14), moderate (n = 11) and severe (n = 9), versus 10 matched healthy controls. | Seven 10 m gait trials at self-selected pace | First metatarsal head, fifth metatarsal head, lateral and medial malleoli, lateral and medial knee articular line and also over the tibial tuberosity | Kinematic and kinetic data from the ankle were acquired only to compute power at the ankle joint as a trigger for the identification of gait phases for EMG data | Compare muscle fibre conduction velocity in the groups with different degrees of diabetic neuropathy |
| [28,29] | Fifty-six elderly women with knee OA grade 2 or 3 (Kellgren and Lawrence). | n/a | Standard Cleveland Clinic marker set, with extra markers | Knee load and knee adduction moment during gait | Investigate the chronic effect of inexpensive and minimalist footwear on OA and gait biomechanics |
| [30] | 21 women (65 (5) years, 68.9 (7.8) kg, 154 (5) cm) with knee osteoarthritis, and 24 women (65 (4) years, 64.8 (8.4) kg, 157 (6) cm) without knee osteoarthritis. | Five barefoot, heeled shoe, and Moleca shoe gait trials | Standard Cleveland Clinic marker set | External knee movement in the frontal plane | Compare gait parameters with the footwear types between the healthy and the osteoarthritic group |
| [37] | 15 knee arthroplasty subjects(age: 64.1years; height: 1.70m, weight: 91.3kg) | Self-selected speed along a 6-m walk way | n/a | Gait cycle time, stance time, swing time | Compare the results of an inertial sensor based gait analysis system with the motion capture system |
| [38] | 16 male and 13 female healthy adults (age: 21.5 (0.6) years, height: 165.4 (10.1) cm, weight: 56.1 (9.9) kg) | Self paced walk in a 6-m walkway with natural and Nanba walking style | 25 markers and marker clusters on various body sites mainly on thigh and lower leg | Knee adduction, knee flexion, trunk rotation, knee flexion moment, walking speed, stride length | Normal and Nanba style walking |
| [39] | 10 healthy male subjects (age: 21-25 years, height: 1.71 (0.05) m, weight: 62 (4) kg) | Treadmill running at 5, 7, 9, 12 and 15 km/h speed | Markers at temple, acromion, lateral condyle of the elbow, styloid process of the ulna, anterior superior iliac spine, posterior superior iliac spine, greater trochanter, lateral condyle of the knee, medial condyle of the knee, lateral malleolus, medial malleolus, heel, and toe. The markers were also attached to vertex, chin, and right blade bone | Muscle activity respect to foot strikes | Fore-foot strike, a mid-foot strike and rear-foot strike |