

# Clinical Gait Analysis

New Technology Available To Measure Objective Treatment Outcomes



The ability to walk is an extremely functional task, and when this ability is compromised, there often is a loss of independence or the need for an assistive device or ambulatory aid, such as a cane or walker. Pain, weakness, leg length discrepancies or deformities, loss of sensation, spasticity or rigidity, balance disorders and lack of coordination can also influence gait function. Consequently, gait assessments, which are performed by therapists almost everyday, are essential in order to ascertain the characteristics and magnitude of gait abnormalities. Studies however, have demonstrated that visual and or subjective gait assessments are unreliable.

While an experienced therapist can detect an antalgic gait and can instinctively sense a lack of consistency, the objective reporting of these inconsistencies is virtually impossible. The differences in assessment style and skill within an organization further exacerbate this ongoing problem. Furthermore, another important dilemma crops up when comparing performance several weeks later. On subsequent gait assessments, many gait characteristics may appear different. Objectively, however, how different are they?

**When evaluating people with gait impairments and disabilities in the clinical setting, subjective descriptions fail to provide the clinician with any quantifiable evidence that can be readily**

**communicated. Therefore, it is vital to quantify these gait parameters under standardized conditions. In fact, most people will agree that measuring baseline gait function is a critical component in quantifying outcomes.**

Unfortunately, many people fail to recognize that most measurement systems simply aren't practical or cost effective to be used daily in clinical settings. Low-tech methods for collecting gait parameters utilizing chalk, ink, or carbon paper may seem effective and inexpensive for measuring spatial gait parameters. Yet, these techniques have several drawbacks: no timing data is measured, they're messy, often inaccurate and unreliable, data analysis is very time-consuming and they can't measure overlapping steps. Furthermore, using a stopwatch to measure timing data has also been proven to be unreliable.

High-tech methods used to measure temporal (timing) and spatial (distance) gait parameters, such as an integrated video/force plate system (designed to measure joint angles, forces and moments), or other tools that require elaborate setup and data distillation have their own set of problems. They are very time-consuming; often subjective (requiring operator judgement) and they are extremely expensive. The high equipment cost and labor cost (usually a Ph.D. or biomechanist), the operator skill or lack thereof, and the interpretation of this information severely reduces the chance of these instruments becoming mainstream clinical products.

**GAITRite, on the other hand, provides instantaneous temporospatial data that can be integrated into most rehabilitation and therapy settings immediately, without the aforementioned concerns. No mess, no time, just good clean accurate data.** Routinely, clinicians are required to document whether knee and lower extremity strengthening, bracing and/or gait training has had an impact on their patient's functional outcomes. By recording

several gait cycles with *GAITRite*, any compensatory mechanisms, inconsistencies and/or asymmetries will become readily apparent and measurable.

**GAITRite...**  
**Measuring Function**  
**One Step At A Time!**

The *GAITRite* system is a commercially available gait analysis system that's easy to use, and instantaneously measures stride length, step length ratio, base of support, velocity and cadence, in addition to many other important gait parameters. The *GAITRite* software produces individual, comparison and outcome reports that make communication to the patient, family, and payor simple and efficient.

*GAITRite* is an electronic walkway that connects to the serial port of a Windows® XP, Vista® and Windows® 7 personal computer. **The *GAITRite* system is 1/8" thick, 2-foot wide by 16-foot long (can be up to 26-foot long) and contains 18,482 sensors sandwiched between a thin vinyl top-cover and a rubber bottom. It rolls up to fit into a wheeled carrying case.** The carpet is portable, can be laid over any flat surface, and requires minimal setup and test time. No markers or devices have to be placed on the patient. Patients can be tested with or without shoes, including those patients using assistive devices and ambulatory aids such as: crutches, walkers, or canes.

As the patient ambulates across the walkway, electronic footprints are sensed by the carpet and *GAITRite* captures the orientation and the relative position of each footfall as a function of time. The software then processes the raw data into footfall patterns, and computes the temporal and spatial parameters. Here is an analogy,



if you were to use a stopwatch while your patient walked in freshly raked sand, footprints would be left that could be seen and measured; unfortunately, the measurement would take a long time. With *GAITRite*, you get these measurements in the blink of an eye, allowing you to maximize the efficacy of your patient's treatment.

**There is a genuine consensus amongst many rehabilitation providers that *GAITRite* is an ideal tool to document, and thus validate, the benefits achieved from various therapeutic modalities. With *GAITRite*, you can objectively quantify your patient's walking function pre- and post-therapy, and consequently, you can document these treatment outcomes in black and white!**

## ***GAITRite...***

### **The Cornerstone of a Movement Analysis Laboratory**

*GAITRite* provides for easy synchronization of *GAITRite* data with EMG and/or video data whenever a more detailed analysis is warranted. Moreover, *GAITRite* is considered by many experts to be the perfect cornerstone product on which to build a gait or movement analysis center. The low cost and low overhead needed for *GAITRite* enables an organization to establish a referral pattern to the center and demonstrate positive utilization and return on investment (ROI).

Once a steady operation is in place, the introduction of kinesiological EMG and simple ROM into the program (to determine muscle function and selected joint range of motion during gait) can be initiated. The same ROI criteria can be used to justify continued program development. Finally, the physician network and community needs may require the highest assessment capabilities to be utilized (for tendon transfers and other delicate surgical procedures). Then, and only then, should you consider the tremendous equipment and labor costs associated with an integrated video/force plate system.

**It's not just the initial start up costs that plague a high-tech lab's success, it's the on-going labor, maintenance and marketing costs that keep most facilities operating in the red. Without grants and external funding, most labs would cease to function. Therefore a stable, educated referral network must be established from day one to overcome these inherent obstacles.**

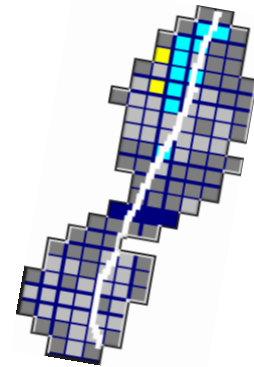
The utilization of *GAITRite* during this growth process offers an organization several important opportunities. *GAITRite* can be taken to or can reside at a satellite center. Or by taking *GAITRite* out into the community, such as schools, community centers, nursing homes and independent living facilities, the collection of accurate walking function information can be used for screening purposes. Whether for fall risk assessment or surgical decision-making questions, *GAITRite* data can be used to screen individuals that may require more detailed analyses or for the follow-up of previously implemented treatment or surgical interventions.

Coincidentally, even established high-tech labs gain improved operating efficiency with *GAITRite*. By utilizing *GAITRite* to establish baseline criteria for entrance into the lab, only those patients presently needing a comprehensive assessment are analyzed. Individuals that have gait abnormalities that don't require immediate attention can be treated remotely and then periodically measured again with *GAITRite* to determine the next step in their treatment regimen. By implementing this strategy, the gait lab's equipment and personnel are utilized to the point of maximum efficiency.

Everyone wins in this scenario. People are seen who need to be seen, when they need to be seen, and follow-up *GAITRite* assessments can direct the lab to the appropriate time to conduct another thorough analysis. Costs all around: to the

payor, patient and lab are minimized while improving documentation and communication. Functional outcomes can be readily tracked and proven, thereby justifying and receiving suitable reimbursement for services rendered.

**In summary, reducing the ambiguity of subjective gait analysis in the clinical setting is within your grasp today. The portability and objectivity of *GAITRite* will greatly enhance your treatment efforts, while giving your clinicians the edge to gain new business, to retain current business, and to command the maximum reimbursement possible for services rendered. With the increasingly stringent requirements of managed care, standardizing your gait assessments by using the *GAITRite* system will be paramount to your success today, tomorrow and well into the 21st century.**



## ***GAITRite***

**Footprints You Can See...  
Measurements You Can Trust!**

It's very easy to learn more about *GAITRite*. You can contact Michael Rowling at 1-610-449-4879, sales@gaitrite.com or visit their web site at www.gaitrite.com. Once at their site, you can download a brochure, PowerPoint slides, and the *GAITRite* Office Manager's Handbook.

***GAITRite*—CIR Systems, Inc.  
Worldwide Sales & Marketing Office  
60 Garlor Drive • Havertown, PA 19083  
Phone: 610-449-4879 • Fax: 610-853-2925  
Web Site: www.gaitrite.com  
E-Mail: sales@gaitrite.com**