

## Gait & Posture

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Full length article

# Clinical efficacy of instrumented gait analysis: Systematic review 2020 update

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### Highlights

- Literature on the clinical efficacy of gait analysis (3DGA) has greatly expanded.
- There is strong evidence that 3DGA changes and reinforces treatment decisions.
- 3DGA increases confidence in treatment planning and agreement among clinicians.
- 3DGA can help define diagnostic groups and understand expected treatment outcomes.
- 3DGA can improve patient outcomes if recommendations are followed.

### Abstract

#### Background

This paper updates our 2011 systematic review on the clinical efficacy of three-dimensional instrumented gait analysis (3DGA).

#### Research question

What is the current evidence base pertaining to the clinical efficacy of 3DGA?

## Methods

We identified English language articles published from September 2009 to October 2019 reporting primary research that used typical motion analysis laboratory methods to study human walking. Five gait laboratory experts classified articles according to the highest type of efficacy they addressed: type 1 (technical), 2 (diagnostic accuracy), 2b (outcome prediction), 3–4 (diagnostic thinking and treatment), 5 (patient outcome), 6 (societal). Articles classified into type 3–4 and higher were rated for quality using LEGEND.

## Results

Of 2712 articles related to the efficacy of 3DGA, over 99 % addressed technical (n = 313), diagnostic (n = 1466), or outcome prediction (n = 927) efficacy. Six type 3–4 studies showed that 3DGA changes treatment plans, increases clinicians' confidence in their treatment decisions, and increases agreement among clinicians. Two type 5 articles based on a randomized controlled trial demonstrated that patient outcomes improved only when 3DGA data were available and its recommendations were followed. A population-based type 5 study found that the incidence of severe crouch gait dropped from 25 % to 4% following practice changes including the addition of 3DGA. The strength of evidence was mainly 3b (lesser quality prospective cohort studies) but also included stronger studies (three level 2 controlled clinical trials).

## Significance

Literature related to the clinical efficacy of 3DGA has grown substantially over the last decade. Thousands of articles contribute to continued improvement of data collection and interpretation, as well as understanding of gait pathology and treatment. A smaller number of studies clearly demonstrate the efficacy of 3DGA in changing and reinforcing treatment decisions, increasing clinicians' confidence in treatment planning, and increasing agreement among clinicians, as well as the potential to improve patient outcomes.

## Keywords

Gait analysis; Kinematics; Evidence; Decision making; Outcomes

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