**Goal**
Set up an objective method for determining robust gait patterns in patients with total knee arthroplasty.

**Main results**
Clustering gait patterns from 3D optical tracking measurements with competitive neural networks generates prototypes of behaviour that precisely fit clinical assessment.

It has been demonstrated the existence of robust gait patterns, that confirms the clinically tested beneficial effects of total knee joint replacement. This method allows the dynamical computation of prototypes that can be used to assess gait, in diagnosis, as well as in patient follow-up.

![Graph](image1.png)

**Scenario for gait analysis recorded with six cameras**

\[ \Delta w_i(k + 1) = \begin{cases} 
\eta(x(k) - w_i(k)) & \text{if } i = r \\
0 & \text{if } i \neq r 
\end{cases} \]

**Competitive learning ANN update of winner neuron**

![Graph](image2.png)

**Number of groups by thresholding reduction in overall dispersion of patterns with respect to closest prototypes**

![Graph](image3.png)

**Prototypes for original classes (solid line), and clusters obtained (dashed line)**

![Graph](image4.png)