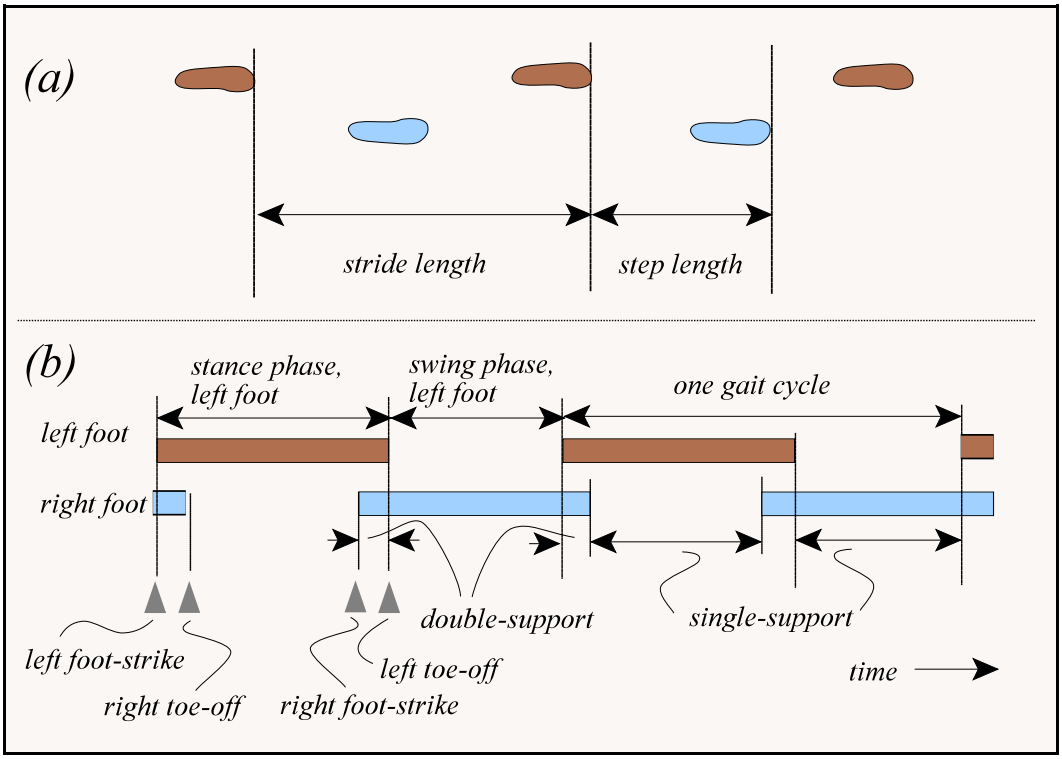

Figure 10.1 Gait parameters, (a) spatial and (b) temporal.

Kinematic Analysis

There are at least three general classes of kinematics: marker kinematics, segment kinematics and joint kinematics. Marker kinematics consist of the linear displacement, velocity and acceleration histories of the coordinates of markers or targets placed on a body and digitized by specialized software and hardware. In Chapter 5 the process for computing velocities and accelerations were defined. Figure 10.2 shows the trajectories of markers placed on one side and the trunk of a person walking across a laboratory walkway. Below it is the associated stick-figure representation of the same targets. **Stick-figures** are created by joining the proximal and distal markers of each segment.

Segmental kinematics include the linear displacement, velocity and acceleration of the centres of gravity of each segment as well as each segment's angular displacements, velocities and acceleration. Coefficients for determining the locations of segmental centres of gravity were presented in table 6.1 The segment centres of gravity may also be combined to obtain the total body kinematics. Joint kinematics includes the linear and angular velocities of the various joints. Sometimes joint angular displacements of two joints are plotted together in what is called an **angle-angle diagram**. These cyclical diagrams are often used to compare the motion patterns of different persons or to track the changes in a patient's progress during therapy or rehabilitation.