ANCHORING POINTS IN NORMAL AND FIXED VISION GAIT

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INTRODUCTION

Walking gait has an established set of parameters that are instantaneously recognised and easily discernable from other movement actions such as running or skipping [1]. Concomitantly, each person has a unique set of parameters for walking which have been described as their own particular movement signature [2]. The movement signature for walking is determined by anthropometric and musculoskeltal factors and represents an individual specific set of relative kinematic patterns of that particular movement . It can be altered by environmental factors (walking into a head wind), informational factors (marching to music) and intentional factors (race walking without disqualification). Within walking it has been suggested, consistent with anchoring theory, that the spatio-temporal variability at certain points is reduced [3,4]. Typically, the anchor points appear at or about reversal or end points within a cycle, such as when changing gait modes or negotiating obstacles such as roadside edge. These points in walking can be decribed by spatial and temporal parameters. Theoretically, anchor points can be self selected or imposed by musculoskeletal, informational or intentional factors. Measurement of the spatial and temporal variation at these end points can therefore provide an insight into the underlying control mechanisms. As anchor points can be established by visual gaze [2] the fixation of vision should lead to a reduction of the spatial variability while the temporal variability remains unchanged [4].

METHODS

Thirty seven volunteer participants aged 18 to 22 with normal or corrected vision gave their informed consent prior to the experiment as approved by the Human Research Ethics Committee of Australian Catholic University.

A 13.7 metre GAITRite® mat was used to collect comfortable walking gait trials (n=6) under the following conditions: i) baseline gait with self selected anchor points; and ii) imposed gaze anchor points. Each participant was given 2 familiarization trials for each condition prior to data collection. Baseline data and the experimental data were gathered by changing the initial sequence so no learning effects occurred. The kinematic variables of step and stride time, length, velocity, and width; as well as initial, terminal, and total double support time were automatically collected by the GAITRite® computer and stored for future analysis.

RESULTS AND DISCUSSION

A coefficient of variation expressed as a percentage was calculated for the male and female participants on various kinematic variables. The data collected for the 22 female participants followed the expectation where the self selected gaze was more variable than the fixed gaze data (Figure 1). The 15 male participants did not generally follow this trend in the spatial and temporal data (Figure 2).

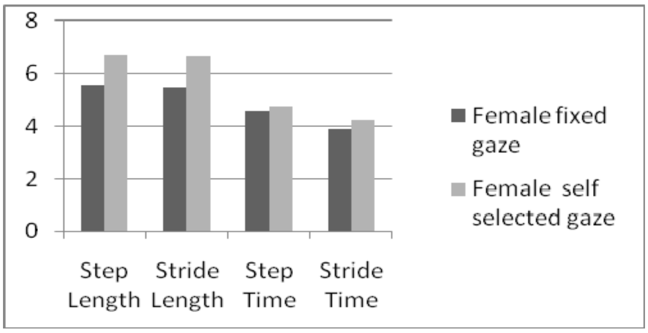

Figure 1 Female Coefficient of Variation Scores

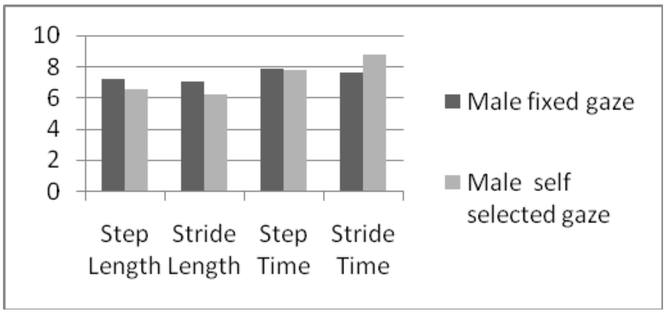

Figure 2: Male Coefficient of Variation Scores

CONCLUSIONS

Anchoring theory has been mainly tested by using non-gait movements. This study used a gait task that has produced mixed results with the females complying with the expectations by reducing their variability in the temporal and spatial parameters reported. The males did not generally follow this trend. The female gait movements follow the trends expected for anchoring theory however the male gait data may have been affected by a different strategy of control mechanism or behavioural intent.

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