

## Putting “Yips” and Jerking in Golf Novices

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### Purpose

Typically Yips is assigned to the occurrence of involuntary movement jerks, spasms or freezing while putting. Between 20% and 30% of golfers seem to be affected by Yips (Smith et al., 2003, Klämpfl et al., 2013). Yips has been described as an organic problem (dystonia), a psychological problem (choking), or a continuum between both (Smith et al. 2003). The co-contractions found in Yips resemble to task-specific dystonia (Adler et al. 2005). Marquardt (2009) suggested that Yips is the consequence of exaggerated self-perception and conscious control. This paper also points out, that the putting data collected with SAM PuttLab shows Yips symptoms also in beginners and high handicap golfers. It is speculated that these novices might bring in the movement problem from other racket sports such as tennis. In the two studies we present here we now investigated Yips symptoms in explicit golf novices who never played golf before, and in golf novices who regularly play tournament tennis.

### Method

The data was collected in an indoor putting studio at the Technical University of Munich. The putts were registered and analyzed with the SAM PuttLab technology. The participants were not informed about the scope of the study. In both studies the test conditions varied in a random order. For each condition 7 putts had to be played to an artificial hole.

In the first study 31 (20 m, 11 f, average age 23 years) sports students (8.3h sports exercise per week) with no golf experience participated. The 9 test conditions were playing a 1m putt, a 3m putt, and putting without a ball, each with both hands, with the right hand only and with the left hand only.

In the second study two age and gender matched groups of right handed participants with no golf experience participated. The participants were recruited so that half of them (n=15, 8 m, 7 f) were playing tournament tennis (average 3.2 h/week, history of playing tennis 20.4 years) and half of them (n=15, 7 m, 8 f) were explicitly not playing any racket sports, but doing other sports. The 6 test conditions were

playing 3m putts to the left (conventional) and to the right (using a left-hand putter), each with both hands, left hand only, or right hand only.

## **Analysis/Results**

The results from the first study showed that in golf novices jerking similar to Yips symptoms occur. Seven of 31 participants (22.6%) could be identified who showed severe jerking indicated by an extremely high variability in the rotation rate at impact (average SD=30.6 deg/s), in particular if putting with the right hand only. This parameter has been found to be the most sensitive putting parameter to identify Yips in amateur golfers (average SD=22.6 deg/s; Marquardt, 2009). To more precisely quantify Yips and jerking a new parameter is proposed. A jerk corresponds to large oscillations of the acceleration signal. The Yips parameter AROT measures the range of rotational acceleration of the putter in a time window of +/- 100 ms around impact. Using this parameter for putts with the right hand only it was possible to identify two sub-groups and to separate the 7 participants with jerking (AROT > 5000 deg/s<sup>2</sup>) from non-jerking participants (AROT < 2500 deg/s<sup>2</sup>). Comparing these two groups we found significant main effects for variability of Face Direction at Impact ( $F(1,27)=16.3$ ,  $p<0.001$ ), for variability of Total Rotation ( $F(1,27)=12.7$ ,  $p<0.01$ ) and for variability of Rotation Rate at Impact ( $F(1,27)=185.6$ ,  $p<0.001$ ).

In the second study significant differences were found between the tennis and the non-tennis group in many rotation parameters. The Yips parameter AROT was significantly higher for the tennis group, but only if playing a right forehand (3932 deg/s<sup>2</sup>). In all other conditions AROT was in the same range as for the non-tennis group (<1500 deg/s<sup>2</sup>). Variance analysis showed a significant interaction for AROT between group and test condition ( $F(1,47,41.5)=3.85$ ,  $p <0.05$ ). Looking at individual performance AROT classified four of 15 subjects (26%) in the tennis group as Yippers (AROT > 7500 deg/s<sup>2</sup>, threshold=4000), but none of the subjects in the non-tennis group.

## **Conclusions**

Both studies found jerking in golf novices very similar to Yips in golfers. The incidence of affected subjects (22.6% respectively 26.6% in the tennis group) matches to the numbers discussed for golfers. Evidence for transfer effects from other racket sports is supported by the fact that only the tennis players were affected by jerking. Our conclusion is that at least in golf novices, jerking is a general behavioral

movement control problem connected to the accuracy demanded by the task, in this case putting. Additionally, the task dependency in the novices is surprisingly similar to golfers: Only putts to the left are affected, in particular if played with the right hand only, but not in any other condition. It is not plausible that novices suffer from dystonia or are affected by performance anxiety only in one putting condition but not in others. The astonishing similarity of the symptomatology suggest that Yips in golfers and jerking in golf novices might be based on the same mechanisms. In fact many golfers also overcome Yips problems by taking the right hand out of the game (claw grip) or by using a left-hand putter and putting to the right side. The right forehand might be mostly affected by jerking because it is the dominant hand and the palm is providing extensive sensory input which then can trigger inadequate motor strategies to control impact. Data collected from left-handed Yippers might help to better understand this directional dependency. For future studies the Yips parameter AROT is proposed as an objective measure to differentiate between Yips affected and normal putting. For golf novices putting with the left hand only the threshold was set to  $4000 \text{ deg/s}^2$ , which is 2SD away from the average of non-affected putting.

*Keywords: Yips, putting, movement analysis, dystonia, choking*

## **References**

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## **Biography**

Dr Christian Marquardt is a neuroscientist, specialising in the fields of medicine, sports and motor behaviour research. He is founder of Science&Motion and inventor of SAM PuttLab.