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# A computer game for patients with Parkinson's disease - a new form of PC based physiotherapy

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# Motivation

- Parkinson's disease:
  - One of the most often nervous disorders in Germany (ca. 300.000 patients)
  - Not curable, symptoms can only be reduced
  - Physiotherapy is crucial cornerstone in rehabilitation



# Objective

- Development of a „Computer game“ as addition for rehabilitation
- Pisa-syndrome, Freezing



# Serious Games

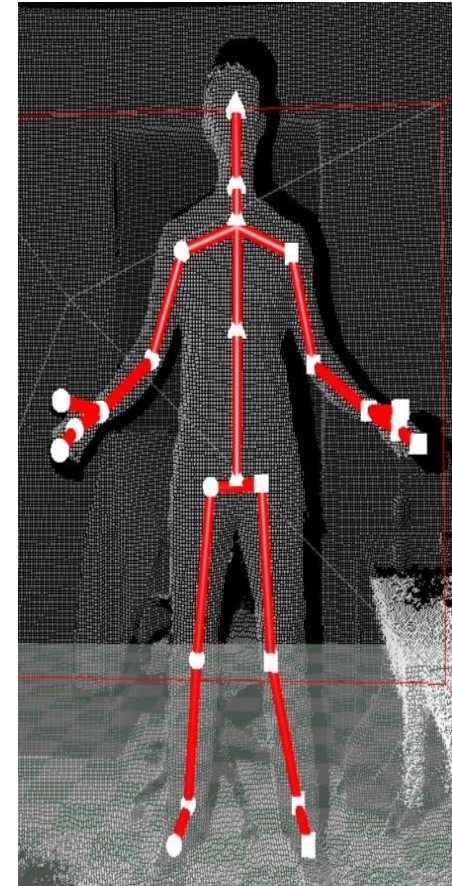
- Entertainment not in foreground
- Acquisition of knowledge and skills



# Requirements

- Markerless motion recording
- Training as a basketball game
- Strengthens body awareness using biofeedback

# Markerless Tracking

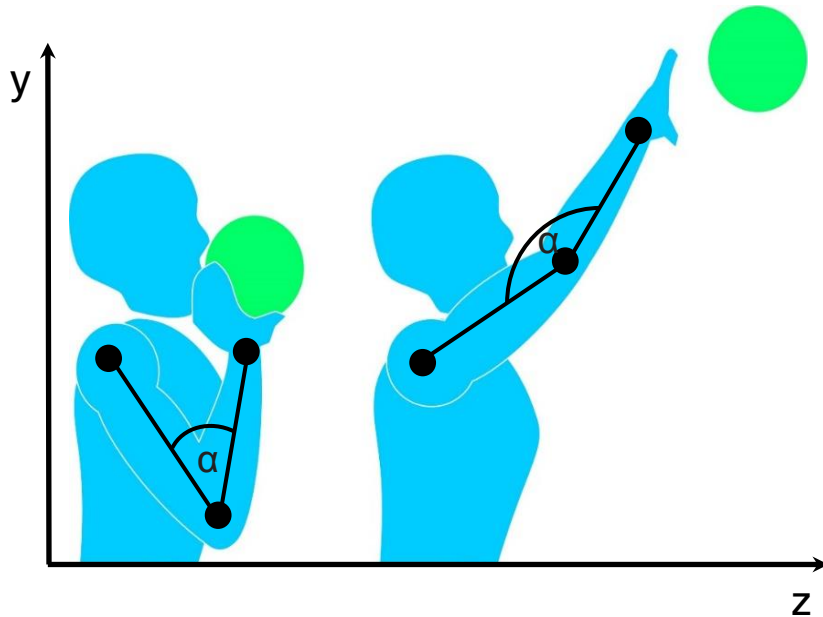


[avatargeneration.com](http://avatargeneration.com)



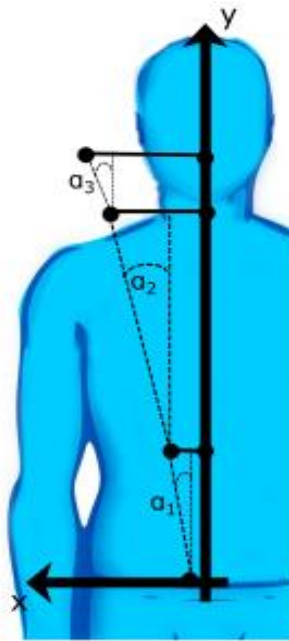
# Software

- Stretching movement of the arms (ball throw)
- Start: Middle hand higher than shoulder
- End: Angle  $\alpha > 75^\circ$



# Software

- Recognition of Pisa Syndrome
- Exceed the angles  $\alpha_1, 2, 3 \rightarrow$  Visual Feedback





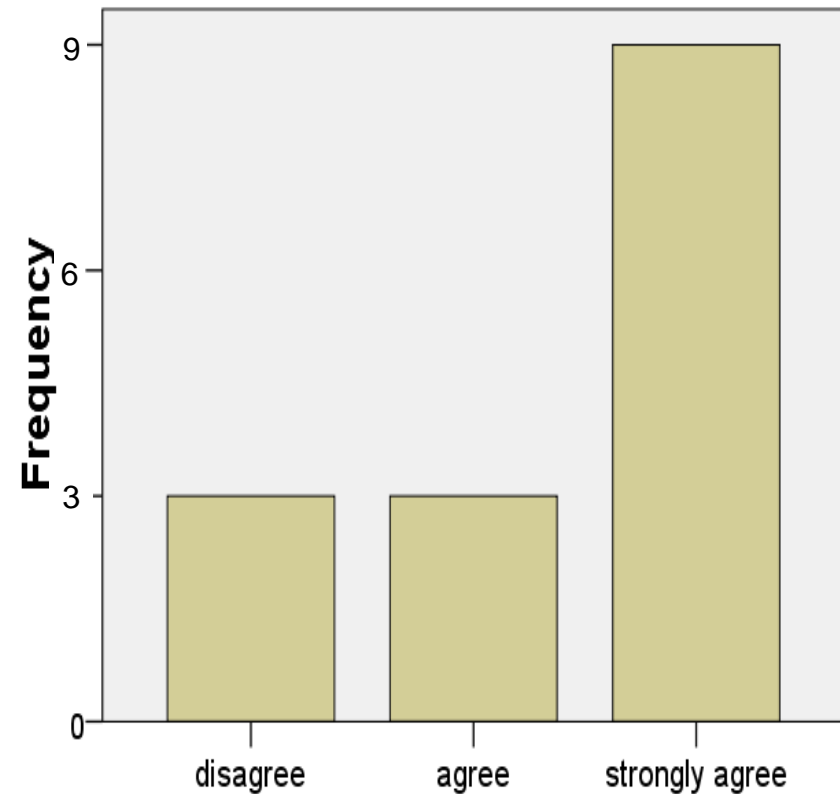
# Preliminary Study– Klinik am Tharandter Wald

- Population: Parkinson's disease
- $n = 15$  patients (10 ♀ / 5 ♂)
- Age:  $71,0 \pm 10,4$  years
- UPDRS:  $26,3 \pm 9,3$

# Preliminary Study– Klinik am Tharandter Wald

- Could you imagine using such a training (home TV, MS KINECT) as an additional rehabilitation method at home?

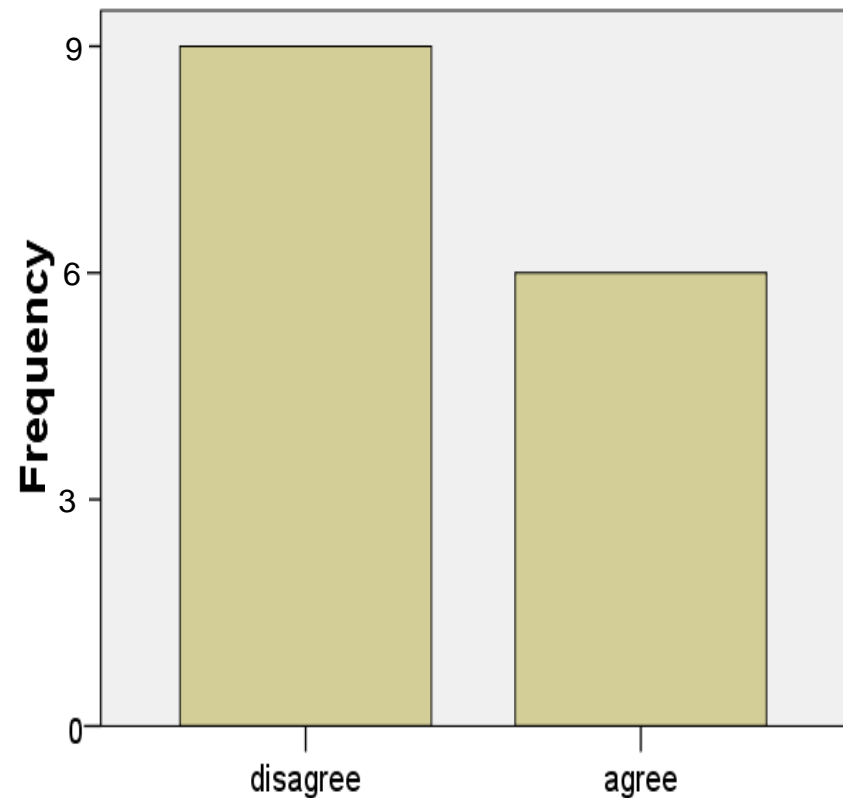
		Frequency	Percent
Valid	disagree	3	20,0
	agree	3	20,0
	strongly agree	9	60,0
	Total	15	100,0



# Preliminary Study– Klinik am Tharandter Wald

- Do you feel the training instructions are suitable on the screen and do you feel adequately cared for? (in case of previous practice with physiotherapists)

		Frequency	Percent
Valid	disagree	9	60,0
	agree	6	40,0
	Total	15	100,0



# Discussion and Outlook

- Development of a prototype for rehabilitation
- Patient acceptance
- Training instructions has to be improved
- Need for movement database

# Discussion and Outlook

- Clear „starting“-gesture (e.g. clap the hands)
- More precise recognition moment when gripping the ball (intuitive)
- Completion of a lateral perspective
- More direct feedback (e.g. Signal tone, screen fade)
- Selection of difficulty level (e.g. easy, medium, difficult)



