# Increasing physical activity in stroke survivors using STARFISH, an interactive mobile phone application

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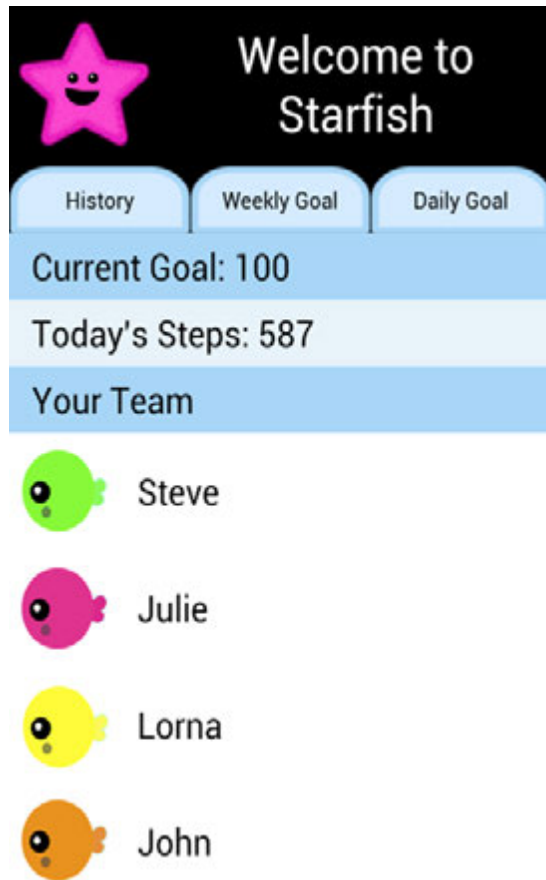
- STARFISH is a smart phone app designed as a behavioural change intervention to encourage physical activity

- The sensors within a standard smart phone record the number of steps taken per day by the individual

- Each person is represented by a fish within a fish tank.

- When the participant is active their fish blows bubbles and swims faster

- As the participant reaches their target number of steps per day, their fish's fins and tail grow.

My Fish

My Steps: 587

My Fish
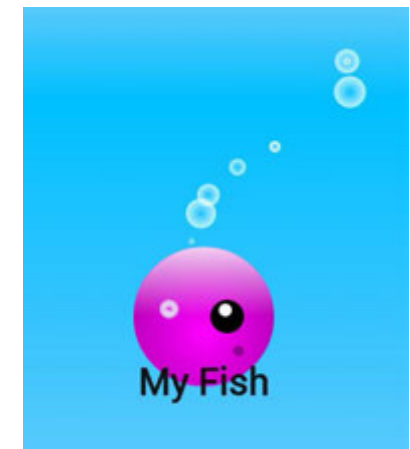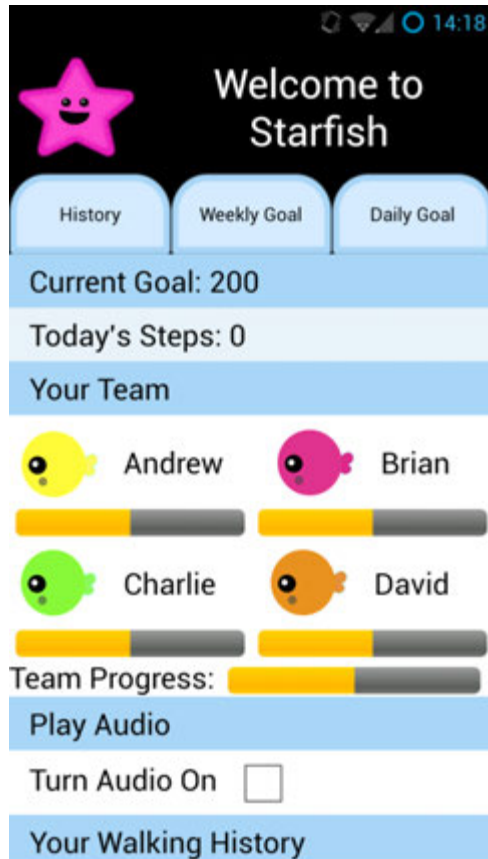
- STARFISH is undertaken in groups of four

- Each fish is distinguishable by colour thus each participant gets feedback on the activity of each member of the group

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- Physical activity targets are individual
- Each person can access their daily or weekly step counts

Welcome to Starfish

| History | Weekly Goal | Daily Goal |

Current Goal: 100

Today's Steps: 587

Your Team

- Steve
- Julie
- Lorna
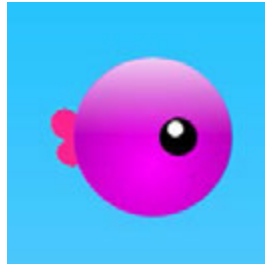- John

Play Audio

Turn Audio On ✓

Your Walking History

Tuesday: 5141

Monday: 0

Sunday: 12587

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- Each week the fish fins grow if the person achieves their daily target
- Physical activity targets are individual
- Individualised feedback for motivation
- If individual reaches their step count target it is increased by 5% for the following week

- Each week a new creature comes to swim in the tank if the group achieve their target on 5 of 7 days in the week (seahorse, octopus, final creature is a Starfish)

- Group reward for motivation

- **4 stroke survivors were recruited from Stobhill Hospital, Glasgow**

- They took part in co-design sessions, where they had the opportunity to express their views on the STARFISH application

- The accelerometer within the mobile phones was also calibrated for stroke gait

- **The existing STARFISH application was adapted by**

  - screen scheme colour changed,

  - text and tick boxes enlarged,

  - progress bars added

  - sensitivity of the touch screen reduced

- **24 stroke survivors (13 females and 11 males; mean age 55.2 (SD 9.7) time since stroke: 4.2 ± 4.0 years) were recruited from stroke support groups in Glasgow, Scotland and allocated to intervention (n=16) or control group (n=8)**

- **Inclusion criteria:**
  - single unilateral stroke
  - discharged from rehabilitation
  - the ability to walk independently, with or without using an aid or orthosis
  - the ability to comprehend instruction

- **Exclusion Criteria:**
  - a history of serious cardiac disease
  - uncontrolled blood pressure
  - significant neurological or musculoskeletal conditions in addition to stroke

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- **Outcome measures taken before and after the intervention:**

  - Physical activity levels over 7 days (ActivPAL)

  - Fatigue Severity Scale (FSS),

  - Instrumental Activities of Daily Living Scale (IADL),

  - Stroke Specific Quality of Life Scale (SS-QOL),

  - Psychological General Well-Being Index (PGWBI)

  - The Ten-Meter Walking Test (10 MWT)

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- **the intervention group followed the STARFISH programme for six weeks**

- week 1 target - the mean number of steps per day recorded on the phone during the baseline period plus 10%

- daily step targets reviewed each week and increased by 5% for the following week if users had achieved their step count target on 5 of 7 days, if they had not achieved their target the previous week it was unchanged

- at week 3 participants attended the CRF for informal discussion and review of targets

- **Control participants**

  - usual care for six weeks

  - completed the same outcome measures as the intervention group

  - following the control period they were given the opportunity to follow the STARFISH programme for six weeks

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	Intervention Group (n=15)		Control group (n=8)		Group/ Time Interaction
	Baseline	Week 6	Baseline	Week 6	
Step count	3993 (2384)	5774 (2926)	3640 (3498)	2936 (2409)	0.005*
Sedentary time† (hrs)	19.48 (1.81)	18.54 (2.16)	19.94 (1.78)	19.36 (2.76)	0.705
10MWT (m/s)	0.36 (0.19)	0.42 (0.18)	0.37 (0.26)	0.41 (0.19)	0.967
SSQoL	171.3 (36.3)	185.4 (35.4)	169.0 (50.1)	176.8 (55.5)	0.313
IADL	5.3 (1.9)	5.3 (1.4)	4.8 (2.3)	5.5 (1.6)	0.090
PGWBI	76.7 (17.7)	79.8 (15.0)	79.4 (14.8)	82.6 (19.8)	0.961
FSS	3.6 (1.4)	3.1 (1.4)	4.1 (1.4)	5.2 (1.6)	0.003*

10MWT= Ten Meter Walking Test, SSQoL=Stroke Specific Quality of Life scale, IADL,=Instrumental Activities of Daily Living Scale, PGWBI= Psychological General Well-being Index, FSS= Fatigue Severity Scale.

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- STARFISH appeared to be a fun way to improve physical activity and health outcomes in people after stroke

- Grant secured from Chest, Heart and Stroke Scotland for fully powered randomised controlled trial
- 58 people in each arm of the study: intervention vs control
- 4 month intervention with 2 months follow up
- Anyone interested in being involved contact

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Chest Heart & Stroke Scotland