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HONG KONG YOUNG WOMEN'S CHRISTIAN ASSOCIATION

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

HIGH TECHNOLOGY – PILOT PROJECT OF COLLABORATION BETWEEN HKYWCA MING YUE DECC AND HK POLYTECHNIC UNIVERSITY:

TELE – REHABILITATION OA KNEE PROGRAM

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User feedback

BACKGROUND

- In Hong Kong
- Men aged 50 or above:
  - 17% had persistent Knee pain,
  - 7% can be diagnosed to have OA Knee.
- Women aged 50 or above:
  - 24% had persistent Knee pain,
  - 13 % can be diagnosed to have OA Knee.

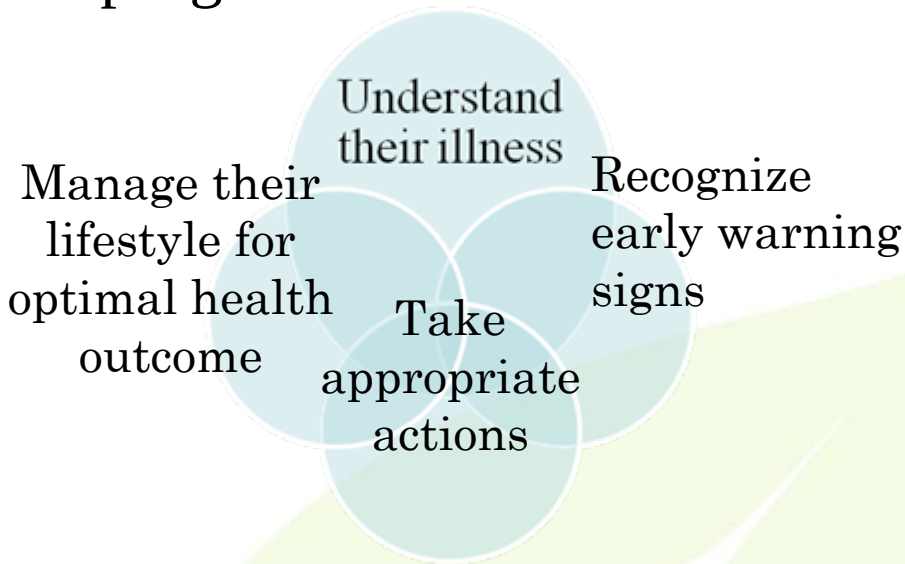
(CUHK, 2000)

BACKGROUND

- Exercise plays an important role in osteoarthritis management (Creamer & Hochbert, 1997; Cote, 2001; Jordan, et al., 2003)
- Symptoms and function improve while receiving a course of active treatment (Deyle et al., 2005; Kettunen & Kuiala, 2004, Segal, et al., 2004van Baar et al., 2001)
- But the beneficial effect cannot be maintained because of incompliance to the home exercise program (O'Reilly et al., 1999)

SELF-MANAGEMENT MODEL

- Encourage patients' active participation and adhere to rehabilitation program



- It requires periodic assessment of symptoms & treatments related to the condition – self-monitoring

McFall et al. 2000, Paterson & Thorne 2000

TELE-MONITORING

- "Delivery of rehabilitation services over a distance using electronic information and communication technologies" (Rosen 1999)
- Traditional ways: telephone calls, videophone,
- Video-conferencing : assess functional activities, gait, home environment through real-time video and audio interaction
- There is lack of reliable and quantified assessment tools for use in tele-rehab. (Winters & Winters 2004)

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FEASIBILITY STUDY ON THE USE OF TELE-MONITORING (™) ON COMMUNITY DWELLING WITH OA KNEE

- Institutions:
  - Dr & Mrs Lui Che Woo Centre for the Knee (The Hong Kong Polytechnic University)
  - Hong Kong Young Women's Christian Association Ming Yue District Elderly Community Centre
- Duration of study;
  - 2008- 2012

SELF-EVALUATION (T-MAK)SYSTEM

1. VAS Pain Scale
2. Knee ROM
3. Isometric Quadriceps Strength
4. Timed-Up and Go Test (TUG)
5. 30 seconds Chair Rise Test

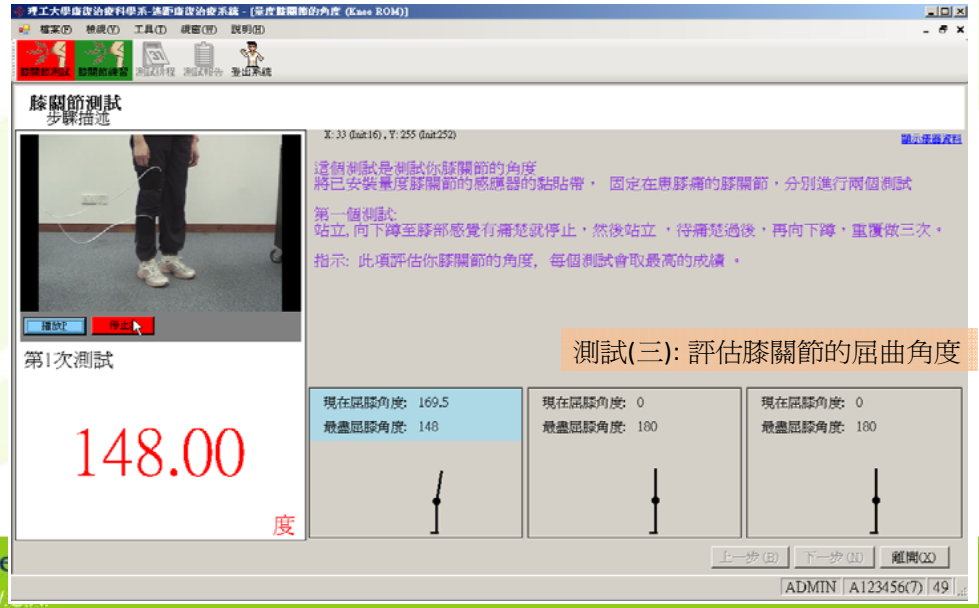
VAS PAIN SCALE

- Move the button to the value representing intensity of pain level

- From 0 to 10 represented by a 100 mm line

KNEE FLEXION ANGLE IN STANCE

- Position sensors were wrapped around the thigh and lower leg
- Subject squat down to his/her maximum angle
- Repeat 3 times
- The best knee flexion angle was recorded



測試(三): 評估膝關節的屈曲角度

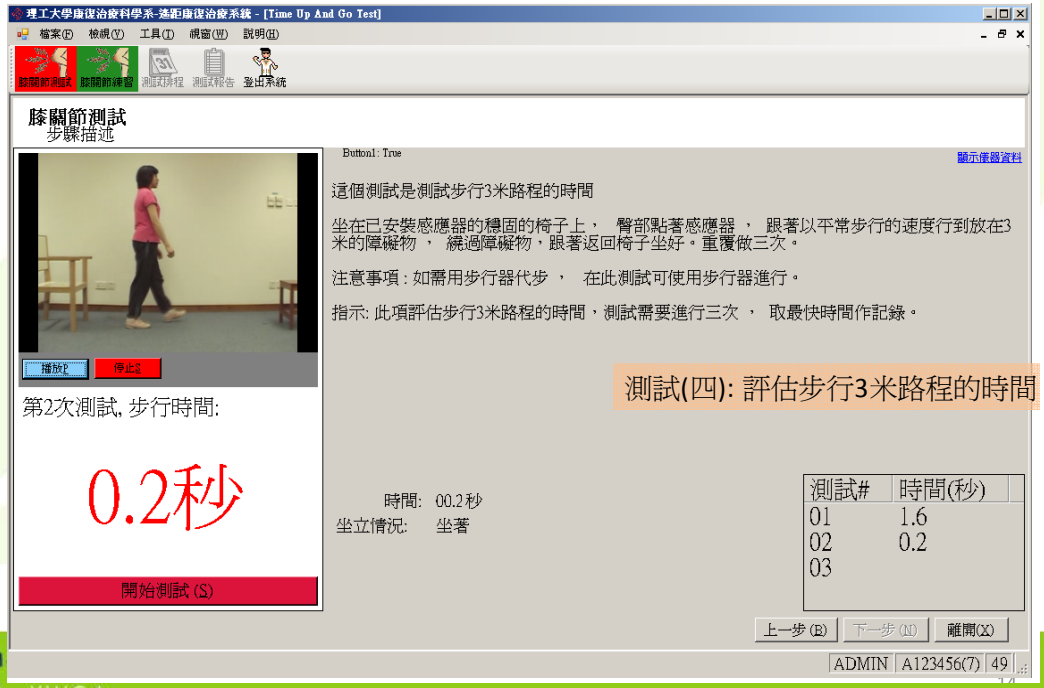
ISOMETRIC QUADRICEPS STRENGTH

- Subject in sitting position, isometric extension against a load cell
- Repeat for 3 times
- Highest force (kg) was chosen

Load cell

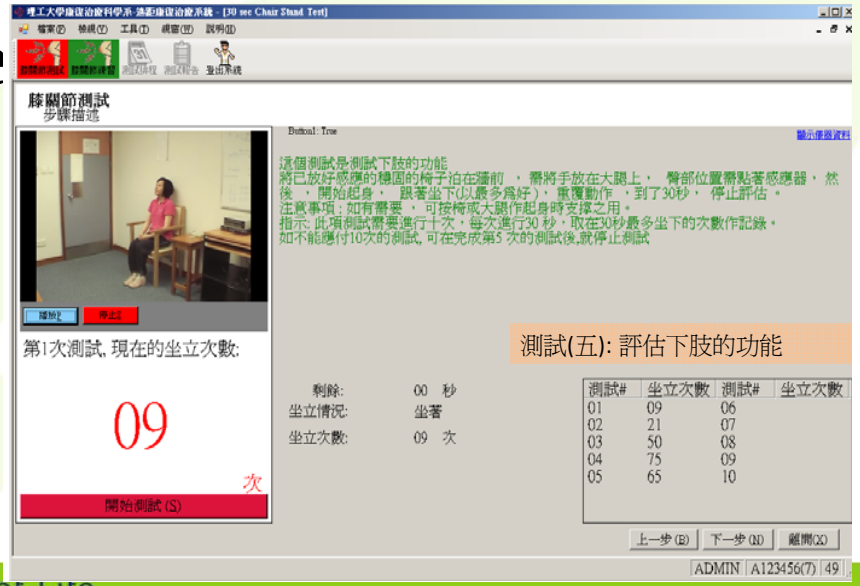
TIMED- UP AND GO TEST

- A light sensor was tapped on the chair
- Subject got up from the chair, walked for 3 m, turned, and seated
- Repeated for 3 times
- Shorted time for the 3 trials



30 SECONDS CHAIR RISE TEST

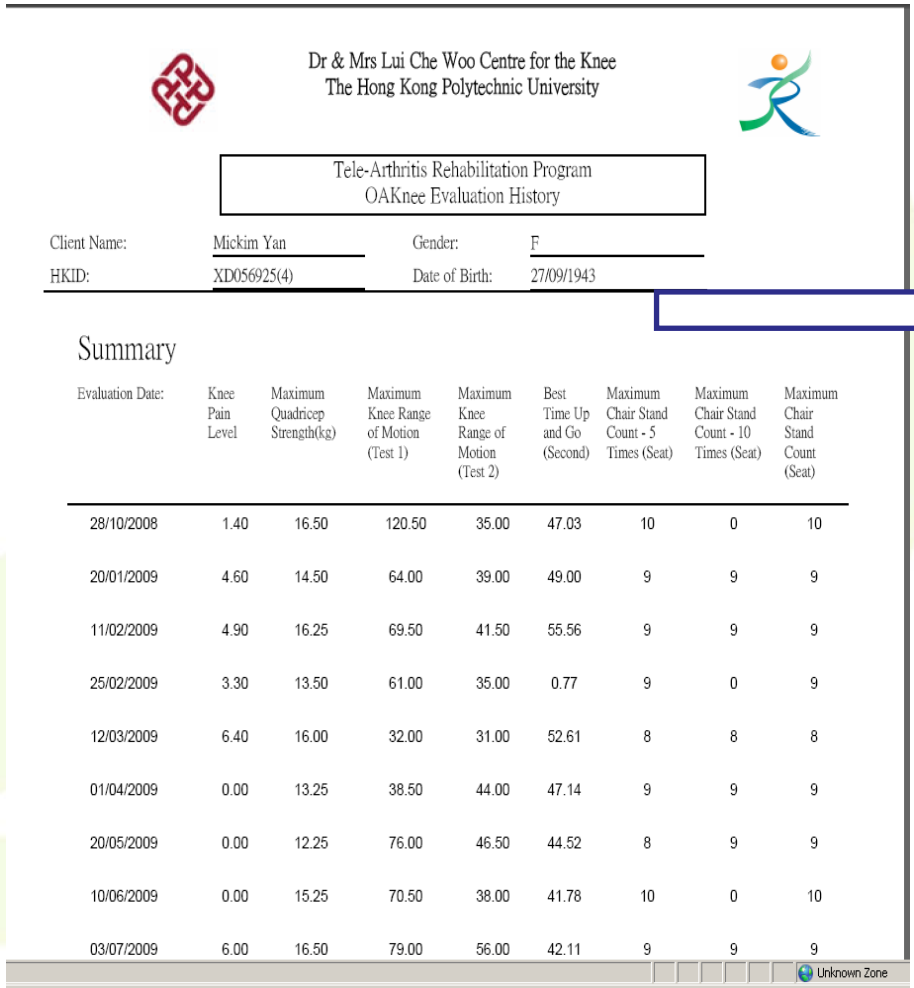
- Measured lower limbs endurance
- A light sensor was tapped on the chair
- Subject was asked to rise from the chair as many as possible for 30 second
- Repeated for 5 times
- The greatest no. of rise was recorded



THE T-MAK SYSTEM

- Information collected will be transferred to PolyU server and monitored by a physiotherapist

- The system would show a red signal if there is change in subjects' data of 20% between tests



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The Hong Kong Polytechnic University

Tele-Arthritis Rehabilitation Program
OAKnee Evaluation History

Client Name: Mickim Yan Gender: F
HKID: XD056925(4) Date of Birth: 27/09/1943

Summary

Evaluation Date:	Knee Pain Level	Maximum Quadricep Strength(kg)	Maximum Knee Range of Motion (Test 1)	Maximum Knee Range of Motion (Test 2)	Best Time Up and Go (Second)	Maximum Chair Stand Count - 5 Times (Seat)	Maximum Chair Stand Count - 10 Times (Seat)	Maximum Chair Stand Count (Seat)
28/10/2008	1.40	16.50	120.50	35.00	47.03	10	0	10
20/01/2009	4.60	14.50	64.00	39.00	49.00	9	9	9
11/02/2009	4.90	16.25	69.50	41.50	55.56	9	9	9
25/02/2009	3.30	13.50	61.00	35.00	0.77	9	0	9
12/03/2009	6.40	16.00	32.00	31.00	52.61	8	8	8
01/04/2009	0.00	13.25	38.50	44.00	47.14	9	9	9
20/05/2009	0.00	12.25	76.00	46.50	44.52	8	9	9
10/06/2009	0.00	15.25	70.50	38.00	41.78	10	0	10
03/07/2009	6.00	16.50	79.00	56.00	42.11	9	9	9

Unknown Zone

SUBJECT RECRUITMENT

54 subjects (> 50yrs) with OA knee from the community centre

with OA knee

according to ACR clinical guidelines

1. Patient education on pain Mx & weight control
2. ROM & flexibility exercises
3. Progressive strengthening closed/open chain exercise to lower limb
4. Balance and gait training

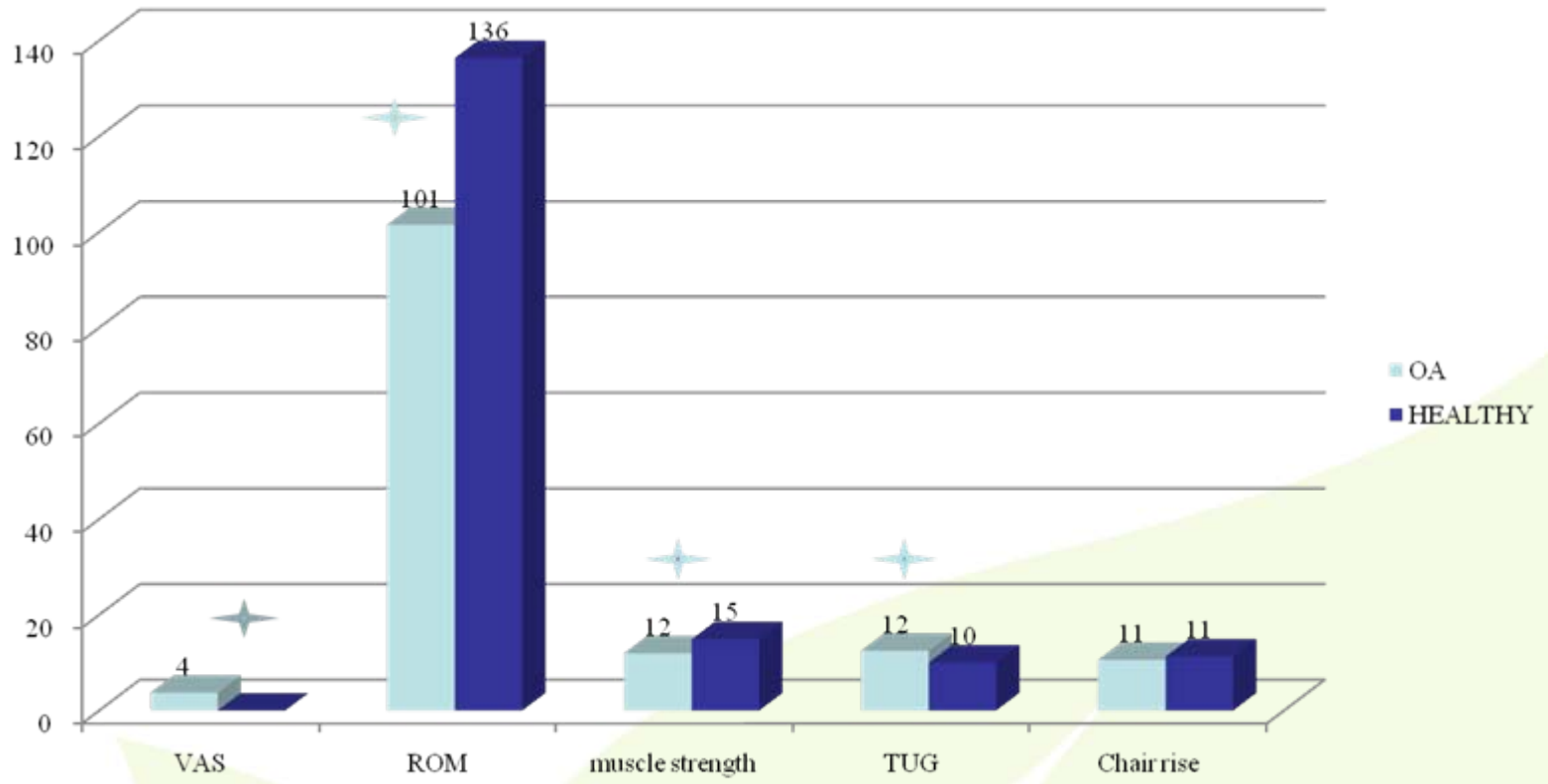
12 lessons Exercise Class

n = 20
5M & 15 F

TM

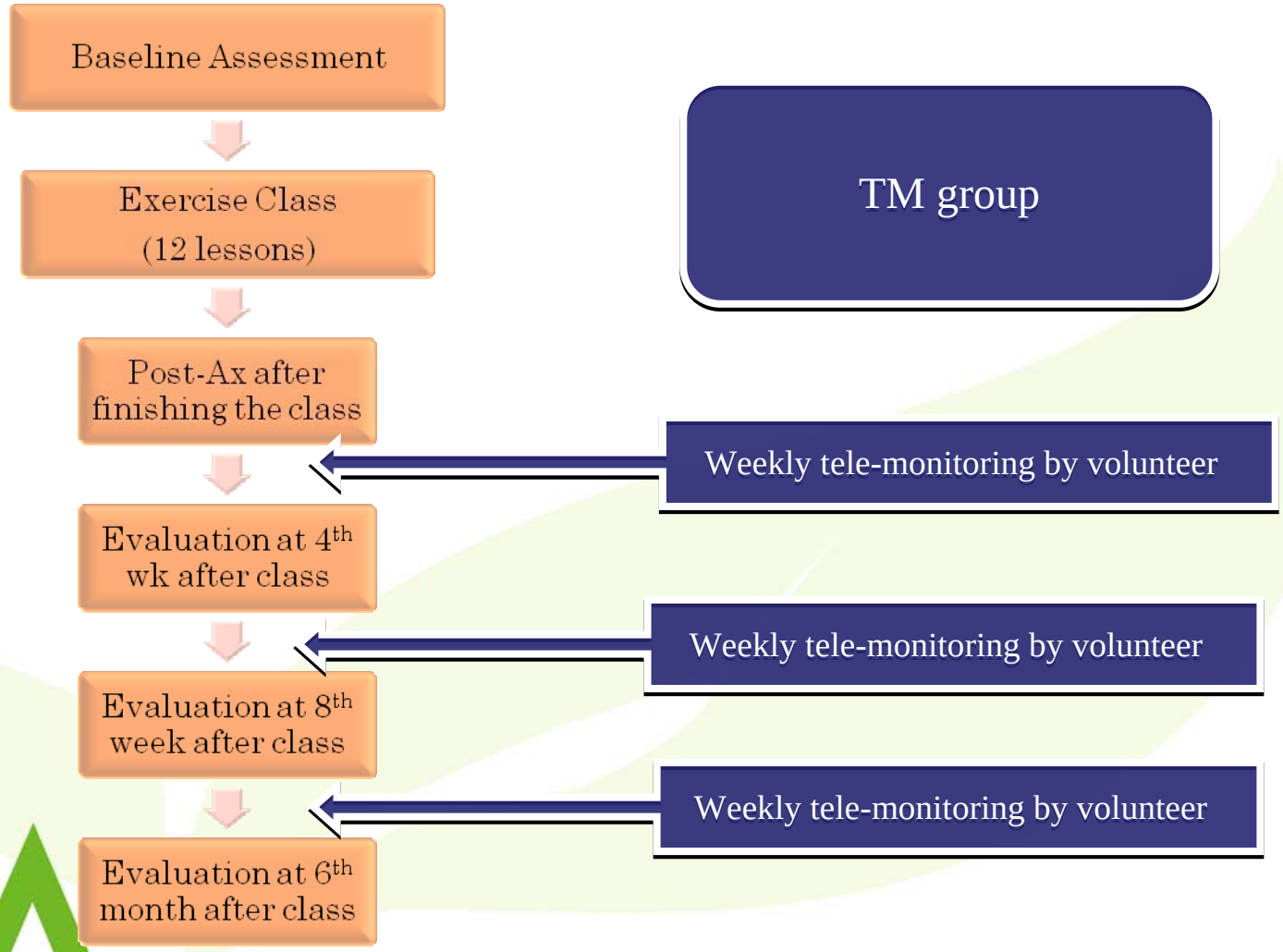
n = 20
5M & 15 F

Control group

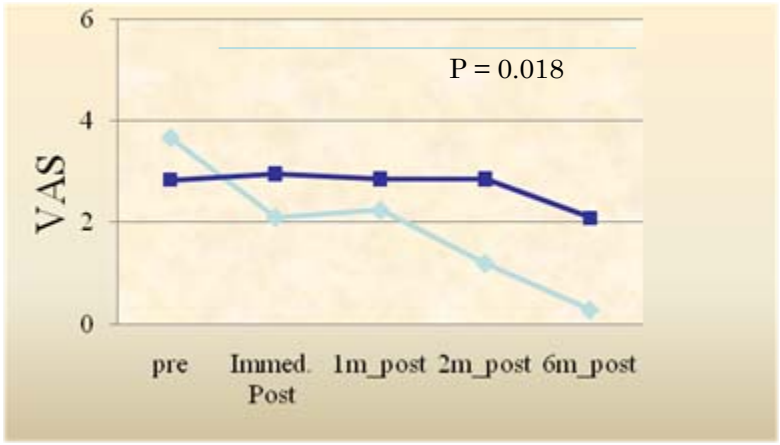


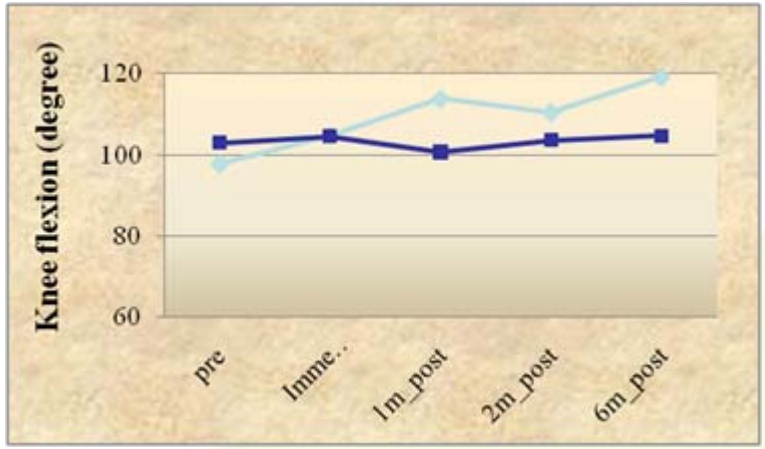
- Indicates $p<0.05$. MANOVA test with $p = 0.000$ followed with univariate analysis of variance between 22 healthy and 54 community dwelling with OA knee

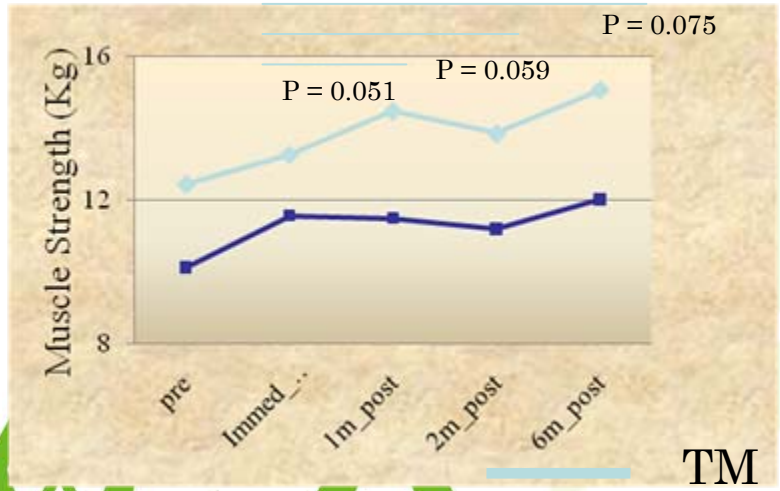
ASSESSMENT

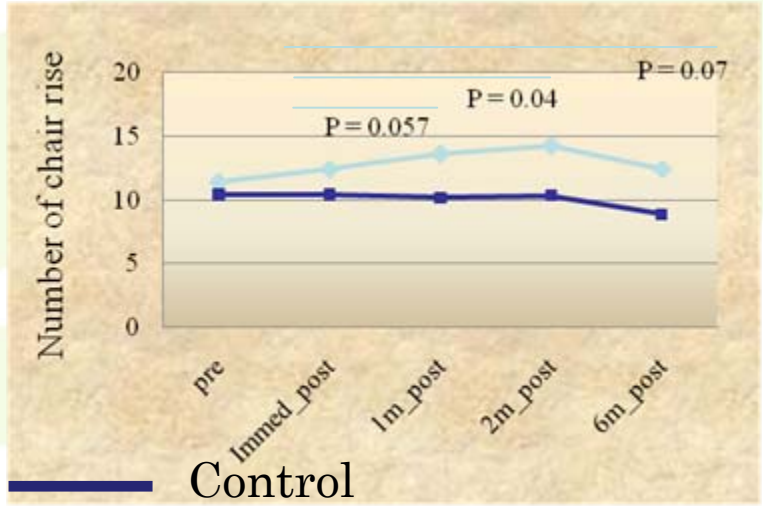

Baseline Assessment
Exercise Class (12 lessons)
Post-Ax after finishing the class
Evaluation at 4th wk after class
Evaluation at 8th week after class
Evaluation at 6th month after class
TM group
Weekly tele-monitoring by volunteer
Weekly tele-monitoring by volunteer
Weekly tele-monitoring by volunteer

Significant time effect was found at 6-month post intervention with significant interventional effects on pain with strong trend on muscle strength and chair-rise tests

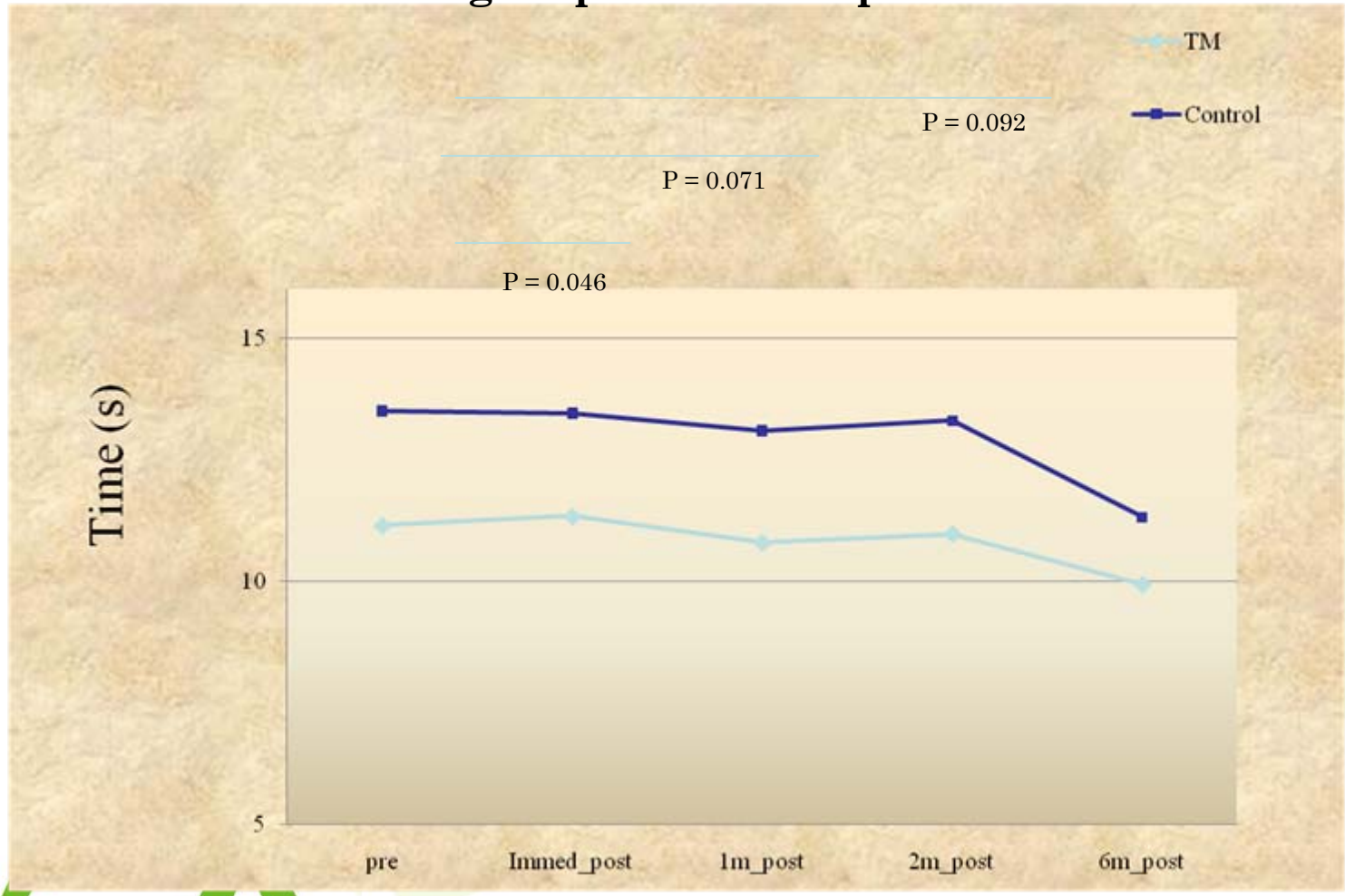








A strong trend of greater improvement in the timed-up and go test was found in the TM group when compared with the control



Summary from the feasibility project

- The T-MAK system is easy to be used at a community centre for active community dwelling with OA knee

- With the support from the T-MAK system, individuals with OA knee were found to have better improvement on their impairments and function in 6-month time when compared with the control group

Home cases

- Knee osteoarthritis is an activity-limiting condition, travel to clinics for rehabilitation may be a difficult task for frail elderly

- Home exercises with support from the T-MAK system were performed on 5 subjects

SERVICE SUPPORT

66 subjects (> 50yrs) with OA knee from the community centre

with OA knee

according to ACR clinical guidelines

12 lessons Exercise Class

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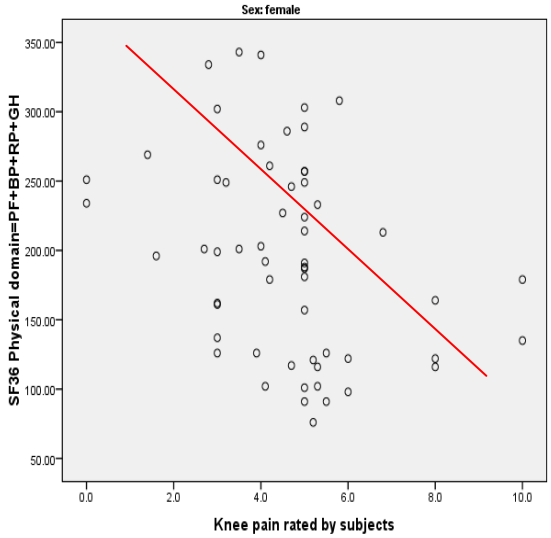
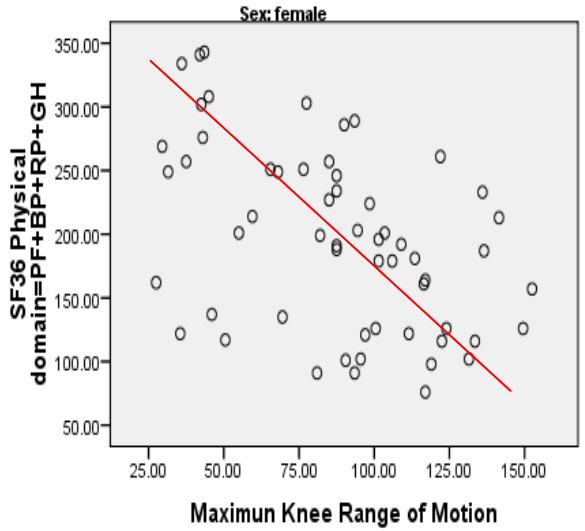
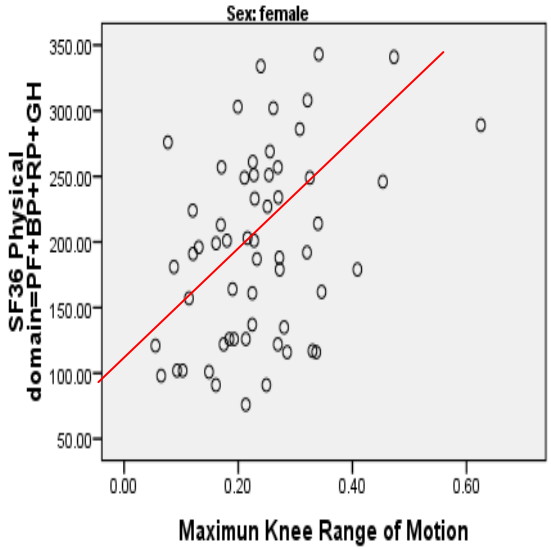
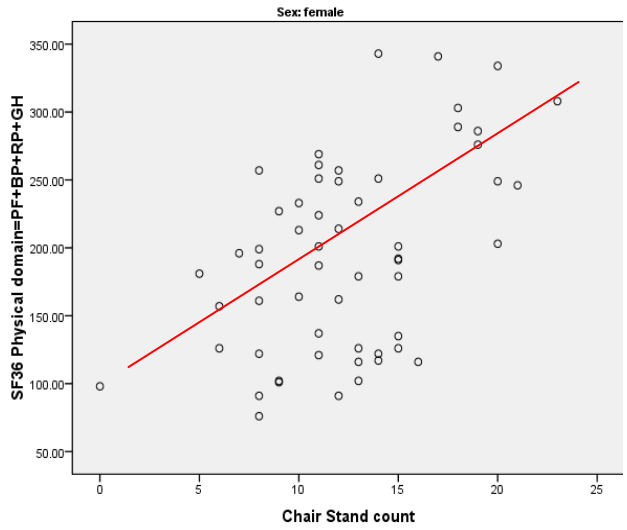
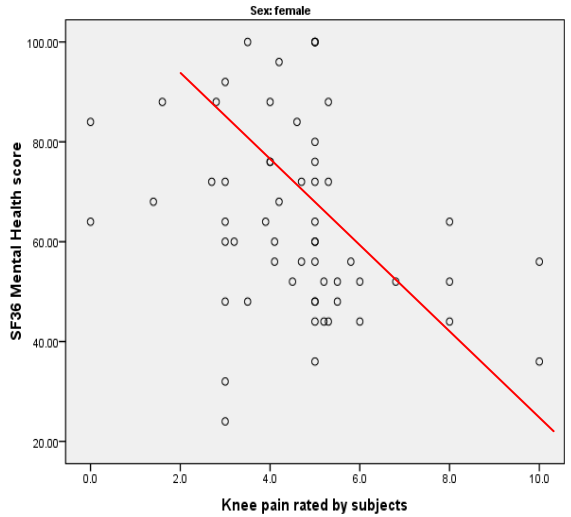
Physical / mental health (SF36) and physical parameters are related in female individuals with OA knee











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TELE – REHABILITATION OA KNEE PROGRAM

COLLABORATION WITH HKYWCA
MING YUE DECC

1. PROMOTION & IMPLEMENTATION
2. VOLUNTEER TRAINING
3. VOLUNTEER INVOLVEMENT

PROMOTION & IMPLEMENTATION

(1) "Talk on OA Knee" & "Consultation on Osteoarthritis" for community dwelling elder

※Supporter: Dr. IP Fu-keung, Consultant of Orthopaedics and Traumatology, PYNEH

(2) Newsletter and Leaflet

(3) OA Knee Exercise Class by Physiotherapist

※ 19 class held for 103 adults aged 55 to 85

※ Criteria selection of members:

- without receiving OA surgery
- suspected OA problem

VOLUNTEER TRAINING

Number of VolunteersParticipated ：31

Number of Trainings ：4

Training Contents：

1) The operation of gadget monitoring system for OA knee
2) Understanding the cause and treatment of osteoarthritis of knee
3) The techniques of assisting the exercise class
4) Communication skills with frail elders

VOLUNTEER INVOLVEMENT

(1) Centre-based Program

a) To assist physiotherapist for conducting assessment with gadget monitoring system

b) To assist physiotherapist for coaching exercise class

c) To have regular contact with elders

d) To facilitate the self-monitoring of elders in the project

VOLUNTEER INVOLVEMENT

(2) Home-based program

a) To assist physiotherapist for teaching elders exercise at home environment

b) To assist physiotherapist for conducting assessment with gadget monitoring system

c) Two volunteers pair up to conduct the home-based assessment between interval

d) Report the status of elders to physiotherapist regularly