

# Recovery of the gait ability after total knee arthroplasty

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## Objectives

Many patients with haemophilia (PWH) undergoes total knee arthroplasty (TKA) at a young age, so the postoperative (POST-OP) rehabilitation should aim at early reintegration into the normal life and society. To that end, recovery of the gait ability is often important.

The aim of this study was to investigate factors affecting the recovery of gait ability after TKA in PWH

## Patients & Methods

Fig 1 Patients data n = 24

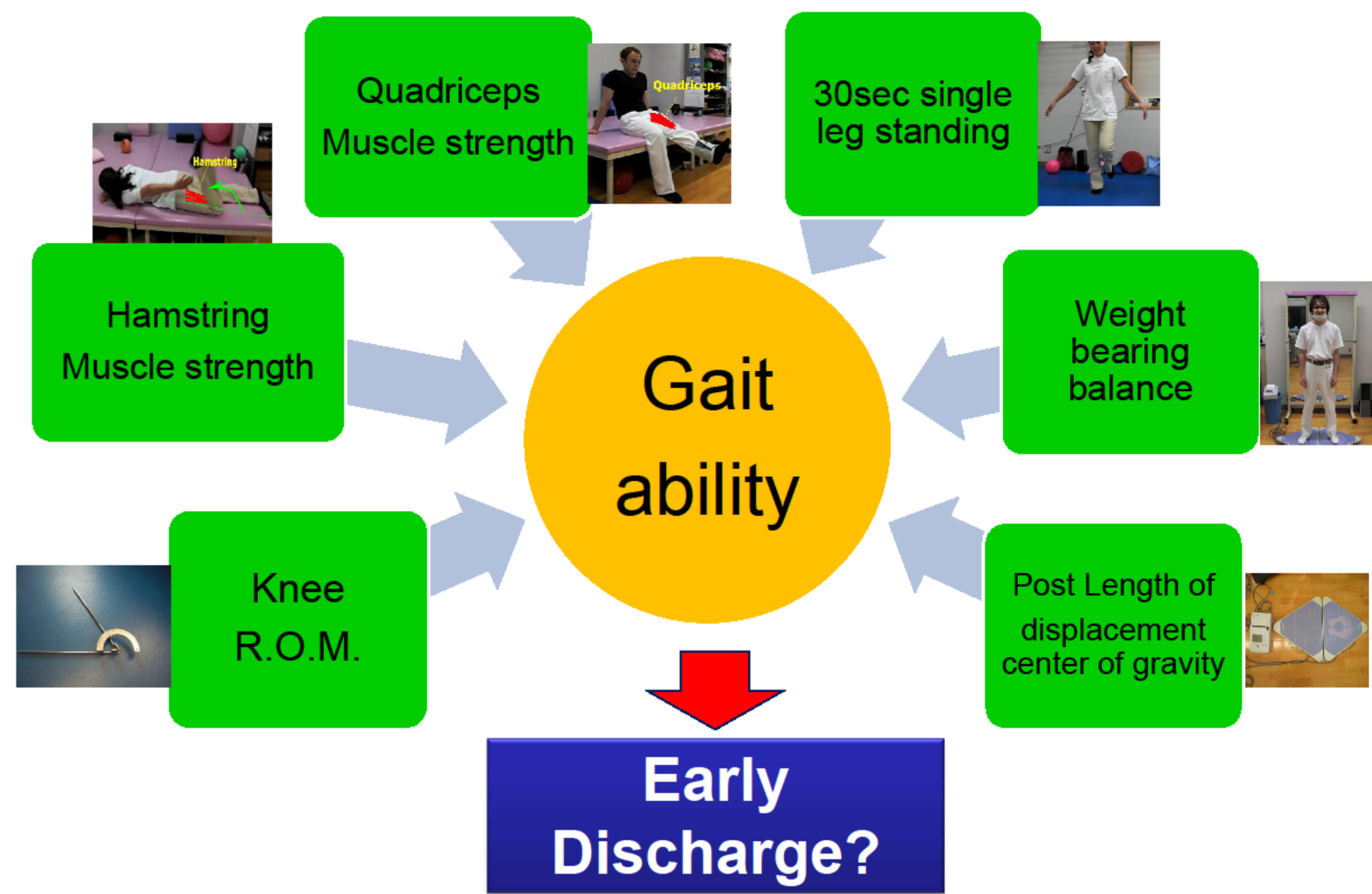
No.	age	Digonosis	Inhibitor	height	weight	BMI	Comorbidity	Left/Right (revision)	Arnold classification
1(1)	61	ModeratA	None	163.3	54.1	20.3	HCV	L	Stage V
2	48	SevereA	High Responder	174	61	20.1	HBV,HCV	L	Stage V
1(2)	62	ModeratA	None	167	52	18.6	HBV	R	Stage V
3(1)	69	SevereB	None	162	61.5	23.4	HCV	R	Stage V
4	44	ModeratA	None	175	67	21.9	HBV,HCV	L	Stage IV
5	40	SevereA	None	180	65	20.1	HBV,HIV	L	Stage V
6	41	SevereA	None	170	66	22.8	HCV,HIV	R(revision)	Stage V
7	22	SevereA	High Responder	180	52	16	None	L	Stage V
8	42	SevereA	None	164.6	52.9	19.5	HCV	R	Stage IV
9	39	SevereA	None	176.5	70	22.5	HCV	R	Stage IV
3(2)	68	SevereB	None	162	61.5	23.4	HCV	L	Stage V
10	47	MildA	None	161.5	57.6	22.1	HCV	R	Stage V
11	32	SevereA	None	169	69	24.2	HCV	L	Stage V
12	47	SevereA	None	172	78	26.4	HCV	L	Stage V
13	47	SevereA	None	171	63	21.5	HCV,HIV	R	Stage V
14	34	SevereA	None	178.5	82.2	25.8	HCV	L	Stage IV
15	46	ModeratA	None	169	87	30.5	HBV,HCV	L	Stage IV
16	34	SevereB	High Responder	162	49	18.7	HCV	L	Stage V
17	37	SevereA	None	165	62.6	22.8	HCV	R	Stage V
18(1)	59	SevereA	None	158	62	24.8	HCV,HIV	L	Stage V
19	33	SevereA	High Responder	151	64	28.1	HCV	L	Stage V
20	30	SevereA	None	175	65.7	21.5	HCV	R	Stage IV
18(2)	59	SevereA	None	158	62	24.8	HCV,HIV	R	Stage IV
21	52	MildA	None	175.5	65	21.1	HCV	L	Stage V
AVERAGE ±SD	45.5±12.5	Severe17(18joint) Moderate3(4joint) Mild2(2joint)	inhibitor4(4joint)	168.4±7.7	63.8±9.2	22.5±3.2	HBV5 HCV18 HIV4 None1	Lt14 Rt10	StageIV7 StageV17

Fig 1: Pre-operative data. 24 TKAs (including 1 re-TKA) performed on 21 PWH (haemophilia A=19 (3 inhibitor); haemophilia B=2 (1 inhibitor)) from October 2009 to May 2013 in our hospital.

We analyzed the factors affecting POST-OP 80m maximum gait speed (MGS) at day of discharge and the difference between preoperative (PRE-OP) and post-op 80m MGS. We evaluated the following parameters: PRE-OP 80m MGS, 30 sec single leg standing (SLS), strength of quadriceps and hamstrings muscle, knee joint range of motion, static standing weight bearing balance, and length of the displacement of the center of gravity. Analyses were performed using correlation analysis of Pearson. ( $0.4 < |r|$ )

## Methods

Fig 2 Each Factors



## Results

Post-op 80 m MGS Pearson's Correlation Coefficient

\*  $0.4 < |r|$  strong correlation

Age	Inhibitor	Height	Weight	Arnold Stage	BMI	Pre-op 80m MGS	Pre Op-side SLS	Post op-side SLS	Pre Unop-side SLS	Post Unop-side SLS	Pre weight bearing balance	Post weight bearing balance	Pre Length of displacement center of gravity	Post Length of displacement center of gravity
-0.293	-0.073	-0.131	0.329	-0.204	0.423*	0.693*	0.607*	0.676*	0.697*	0.687*	0.027	-0.145	-0.354	-0.225

Pre op-side Quad	Post op-side Quad	Pre Unop-side Quad	Post Unop-side Quad	Pre op-side Hamst	Post op-side Hamst	Pre Unop-side Hamst	Post Unop-side Hamst	Pre op-side flex	Post op-side flex	Pre Unop-side flex	Post Unop-side flex	Pre op-side ext	Post op-side ext	Pre Unop-side ext	Post Unop-side ext	Duration of hospitalization (Post-op)
0.465*	0.382	0.459*	0.582*	0.311	0.44*	0.501*	0.542*	0.217	0.232	0.347	0.425*	-0.274	0.04	0.151	0.226	-0.032

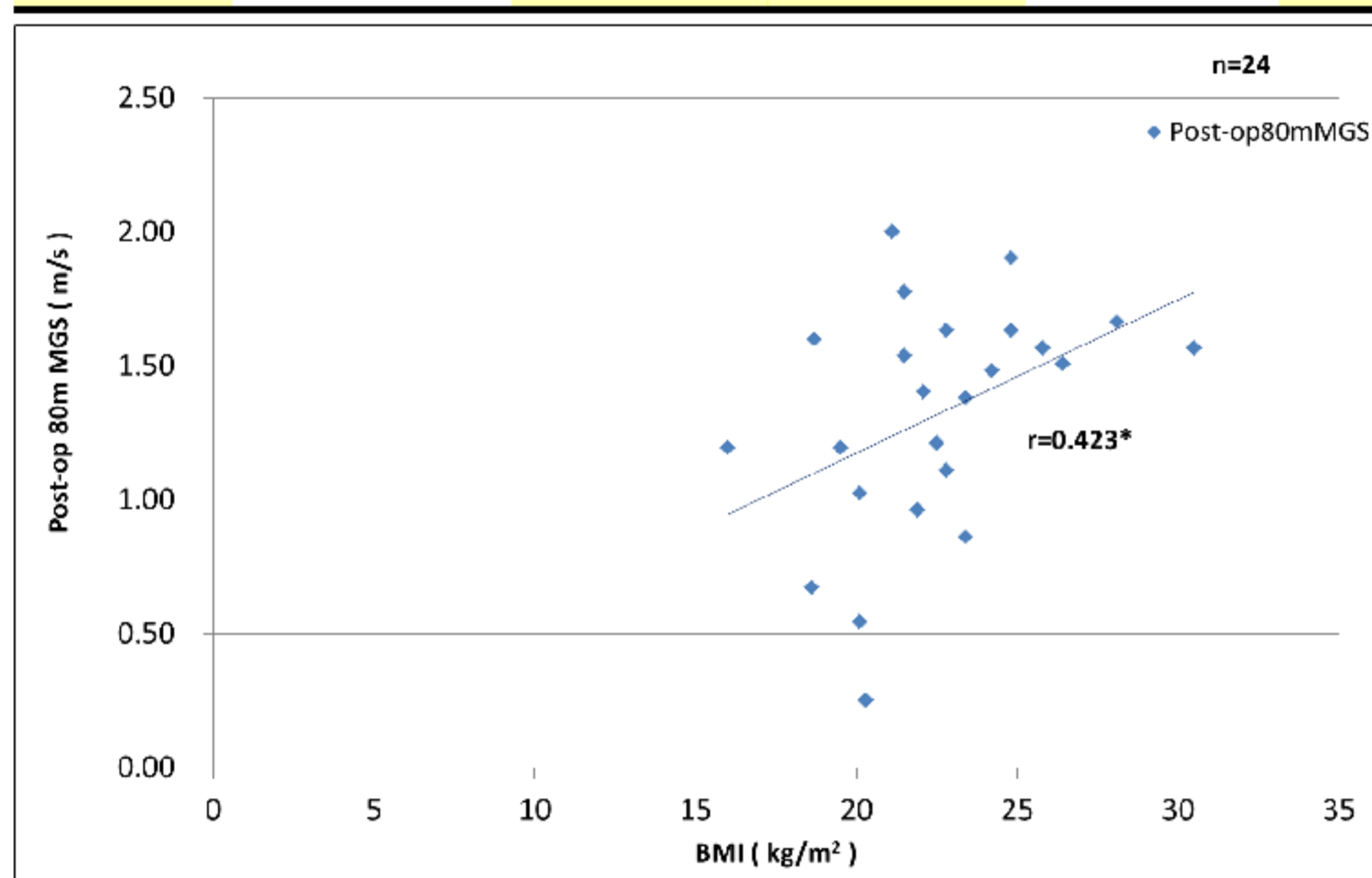


Fig 3 Patients who have lower BMI tend to be faster in Post-Op 80m MGS.

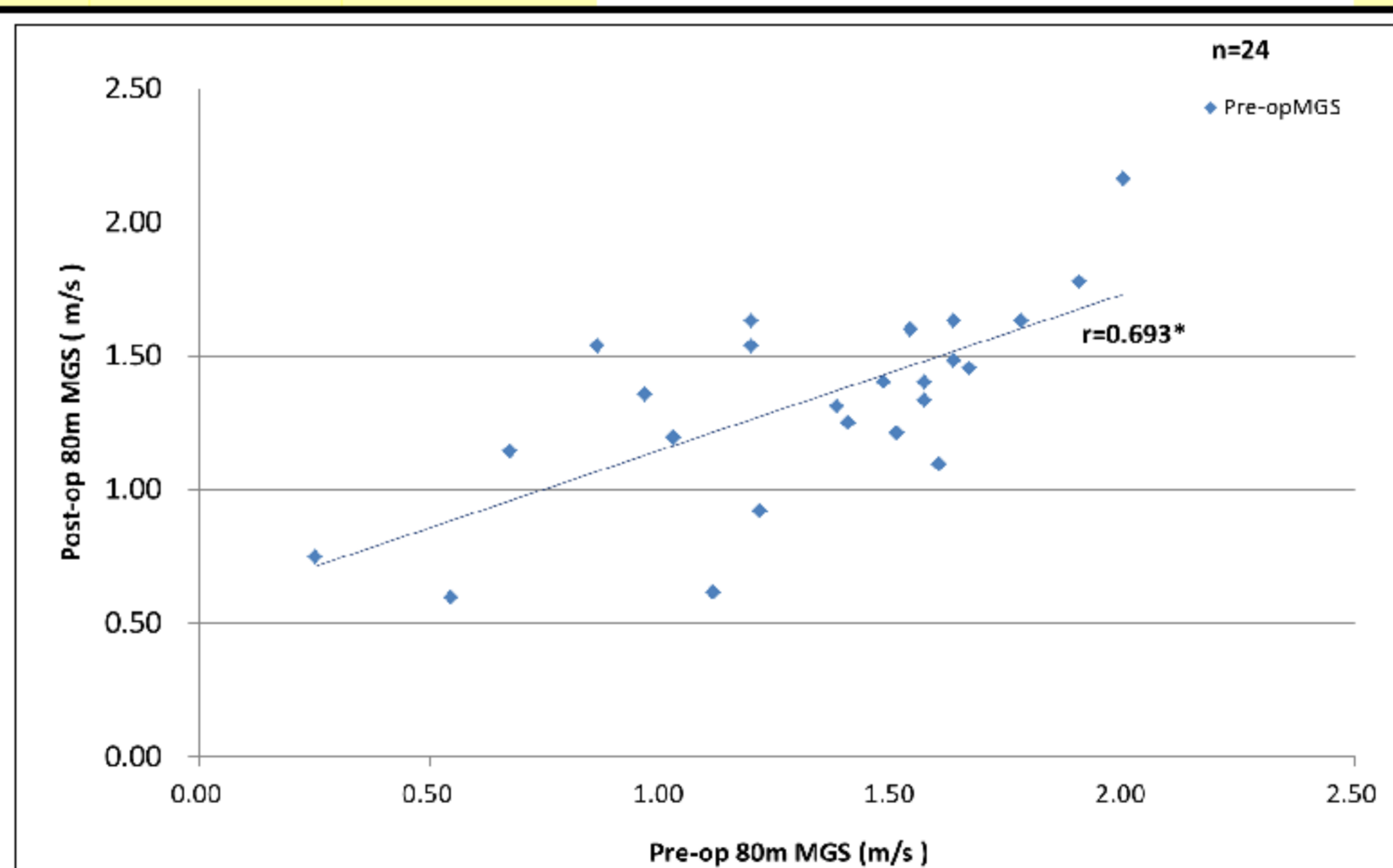


Fig 4 Patients who have faster Pre-op 80m MGS tend to be faster in Post-op 80m MGS.

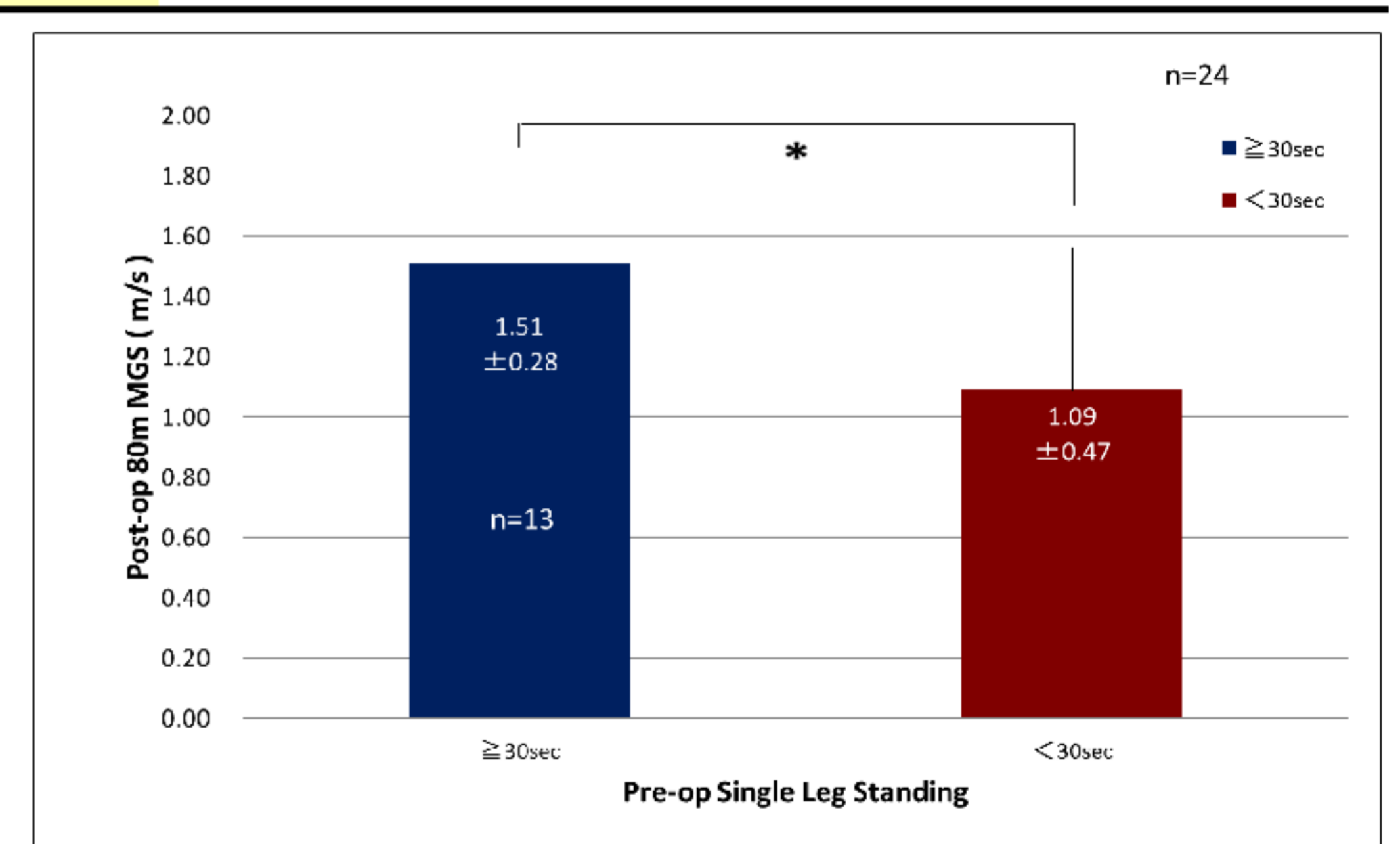


Fig 5 Patients whose SLS ≥ 30 sec are significantly faster in Post-op 80m MGS. \* p<0.05

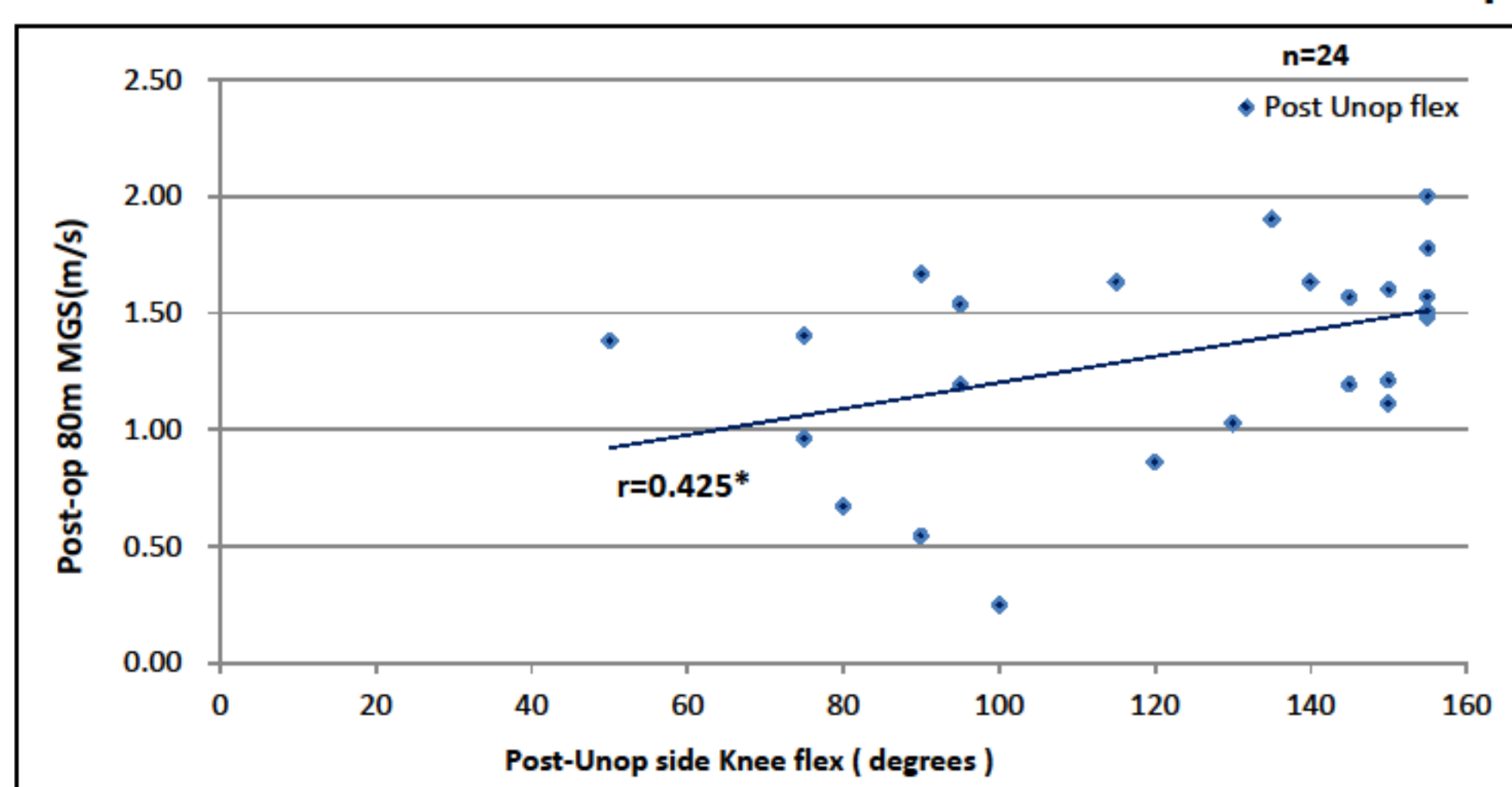


Fig 6 Patients who have better flexion angle of the knee tend to be fast in Post-op 80m MGS.

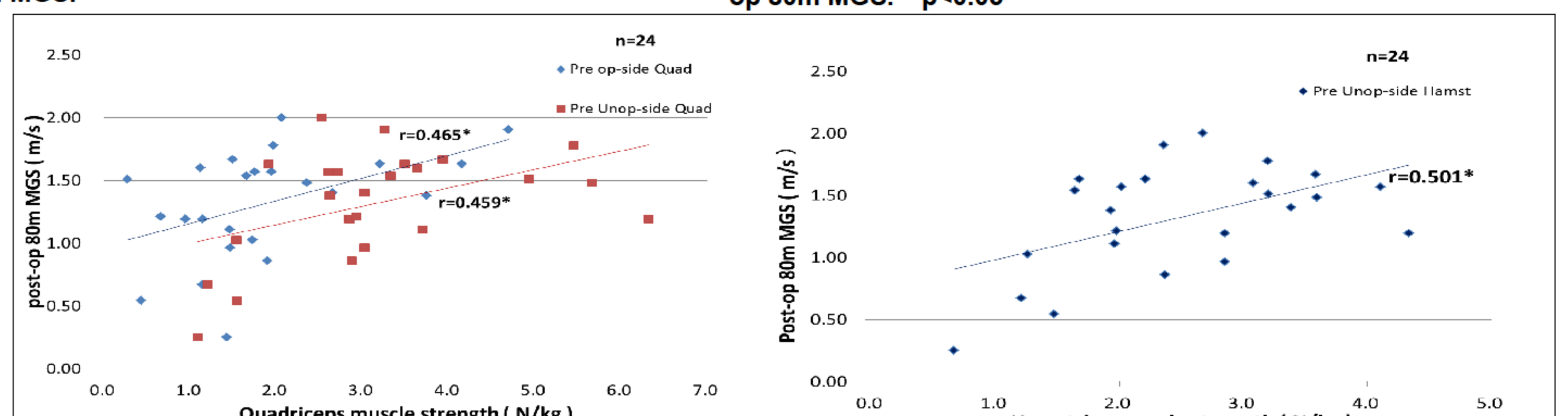


Fig 7: Patients who have stronger Pre-op Quad and Pre-op Hamst muscle strength tend to be fast in Post-op 80m MGS.

## Discussions

Strength of Quadriceps and Hamstring muscles of the Unop-side was correlated with the recovery of post-op 80m MGS. We think that it is because blood loss of haemophilia patients in TKA is higher than that of non-haemophilia patients and functional recovery of operated joint tends to be slower in haemophilia patients. In addition, the balance ability in the single leg standing on both sides (op-side and Unop-side) is the factor which is very important to gain stability during the stance phase and driving force during the swing phase. A possible explanation of the high correlation is that PWH usually has less exercise experience than normal population and their muscle strength tends to be weak for fear of rebleeding because multiple joints are impaired in PWH.

## Conclusions

This study suggest that the recovery of the gait speed after TKA is related to some PRE-OP functions. Therefore, PRE-OP rehabilitation aiming to improve these functions (e.g. reduction of BMI, improvement of SLS and strengthening of quadriceps and hamstring muscles) is important.

