The effect of a balance exercise programme on haemodialysis patients

Ana Júlia Furtado, Fresenius Medical Care, NephroCare Covilhã, Portugal
48th EDTNA/ERCA International Conference | Prague | 17 September 2019
Presentation outline

1. Introduction
2. Objectives
3. Methods
4. Results
5. Conclusion
The effect of a balance exercise programme on haemodialysis patients, Ana Júlia Furtado © FMC-P

---

**Introduction**

- Inactivity
- Serum Ca concentration & Vit D metabolism
- Protein-energy wasting (loss of muscle mass & strength)
- Reduced plasma refill in lower extremities
- Electrolyte disturbances reduce neuromuscular performance (ex. Ca)
- Post-dialysis fatigue
- Hemodynamic changes

---

**HD related factors**

**ESRD factors**
The effect of a balance exercise programme on haemodialysis patients, Ana Júlia Furtado © FMC-P

Introduction

(Magnard, Lardy, Testa, Hristea, & Deschamps, 2015)
Objectives

**Primary objective**
• To evaluate the effect of a specific balance exercise training on hemodialysis patient’s postural control.

**Secondary objective**
• To evaluate the effect of a specific balance exercise training on hemodialysis patient’s body composition.
Methods

Previous history

Since September 2016 – Intradialytic exercise

Aerobic training

Strength training

Results

Muscle power and strength (Sit to Stand 30, Sit to Stand 5)

Agility (8-foot up and go)

No effect on static balance

(Single Leg Stance)
The effect of a balance exercise programme on haemodialysis patients, Ana Júlia Furtado © FMC-P

Methods
Collaboration with the faculty of sports sciences
Methods

Flowchart

Single Leg Stance
Body Composition Monitor

Balance training

12 weeks

Single Leg Stance
Body Composition Monitor
Methods

Measures

Static Balance (Single Leg Stance Test)

Instructions:

One-legged support (dominant leg)
Best of 3 attempts
Maximum 45 sec

Reference ranges

<table>
<thead>
<tr>
<th>Age Years</th>
<th>Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-69</td>
<td>≥ 20.4</td>
</tr>
<tr>
<td>70-79</td>
<td>≥ 17.2</td>
</tr>
<tr>
<td>80-99</td>
<td>≥ 8.5</td>
</tr>
</tbody>
</table>

(Springer, Marin, Cyhan, Roberts, & Gill, 2007)
Methods

Measures

**Body Composition (Lean tissue index + Fat tissue index)**

Lean tissue index (Kg/m²)

Fat tissue index (Kg/m²)
Methods

Inclusion criteria

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Perform the intradialytic exercise programme</td>
</tr>
<tr>
<td>- Performance below the reference range for age in the Single Leg Stance Test</td>
</tr>
<tr>
<td>- History of falls in the previous month</td>
</tr>
</tbody>
</table>
Methods

Intervention – balance exercise training

12 weeks

2 times/week = 24 exercise sessions

10 minutes

Before dialysis

Every 2\textsuperscript{nd} and 3\textsuperscript{rd} HD sessions
Methods

*Intervention – balance exercise training*

**Exercise 1**
Marching on the spot

- 2 sets – 15 repetitions

**Exercise 2**
Semi tandem test

- 2 sets – 30 seconds
Methods

*Intervention – balance exercise training*

**Exercise 3**
Square Stepping

1 set – 5 repetitions

**Exercise 4**
4 direction step

1 set – 3 repetitions
Methods

*Intervention – balance exercise training*

<table>
<thead>
<tr>
<th>Exercise 5</th>
<th>Exercise 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 direction leg raises</td>
<td>Squats</td>
</tr>
<tr>
<td>5 repetitions each leg</td>
<td>20 repetitions</td>
</tr>
</tbody>
</table>

Methods

Intervention – balance exercise training

Exercise 5

4 direction leg raises

5 repetitions each leg

Exercise 6

Squats

20 repetitions
Methods

Intervention – balance exercise training

Every exercise session was supervised by exercise physiologists.
### Results

**Sample description**

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Average±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>67±12</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>29.16±4.15</td>
</tr>
<tr>
<td>Lean Tissue Index (kg/m2)</td>
<td>12.77±2.17</td>
</tr>
<tr>
<td>Fat Tissue Index (kg/m2)</td>
<td>15.84±4.52</td>
</tr>
<tr>
<td>Dialysis Vintage (months)</td>
<td>43.25±23.31</td>
</tr>
<tr>
<td>Intradialytic Exercise Programme duration (months)</td>
<td>8.7±7.1</td>
</tr>
</tbody>
</table>

n = 16
Adherence to balance exercise sessions: 82.38±20.14 %
No adverse events

<table>
<thead>
<tr>
<th></th>
<th>Before Exercise (average±SD)</th>
<th>After exercise (average±SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLS (seconds)</strong></td>
<td>5.60±4.12</td>
<td>10.06±10.48</td>
<td>0.008*</td>
</tr>
<tr>
<td><strong>Lean tissue index (Kg/m2)</strong></td>
<td>12.77±2.17</td>
<td>12.85±2.09</td>
<td>0.898**</td>
</tr>
<tr>
<td><strong>Fat tissue index (Kg/m2)</strong></td>
<td>15.84±4.52</td>
<td>15.78±4.78</td>
<td>0.891**</td>
</tr>
</tbody>
</table>

*Wilcoxon Test
**Paired samples T-test
Results

Previous studies

**Specific balance training included in an endurance-resistance exercise program improves postural balance in elderly patients undergoing haemodialysis**

Bechir Frith, Wajdi Mkacher, Hamdi Jaafar, Ameur Frith, Zohra ben Salah, Mezry El May and Mohamed Hammami

---

Control group: aerobic + strength training

Intervention group: aerobic + strength + **balance** training

**IMPROVEMENT IN BALANCE MEASURES WERE HIGHER IN THE INTERVENTION GROUP**

---

**PREVIOUS STUDIES ARE IN AGREEMENT WITH OUR RESULTS!!**

---

**A Combined Strength and Balance Exercise Program to Decrease Falls Risk in Dialysis Patients: A Feasibility Study**

Paul N. Bennett, Leo Breugelmans, Danwin Chan, Marlena Calo, Cherene Ockerby

---

No control group

**PATIENTS SUBMITTED TO STRENGTH & BALANCE TRAINING SIGNIFICANTLY DECREASED FALL RISK**
Conclusions

Take home messages

• A specific balance training before dialysis is a feasible intervention with no adverse events and good adherence;

• The balance exercise programme improved static balance (despite remaining below the reference range for the general population);

• The intervention also had a slight improvement in body composition;

• The intervention of exercise physiologists in the dialysis units may be a strategy to improve health outcomes in ESRD patients.
Conclusions

Limitations

- Small sample size
- No control group
- Short term follow up
- Low exercise volume (less than recommended)

Future studies

- Influence of balance exercise training on falls incidence and falls-related injuries
References


Thank You Very Much for Your Attention!
Acknowledgments

Hélder Araujo  Head Nurse
Fresenius Medical Care, NephroCare Covilhã, Covilhã, Portugal

Catarina Santos  Medical Director
Fresenius Medical Care, NephroCare Covilhã, Covilhã, Portugal

Pedro Martins  Physical Exercise Program Manager
Fresenius Medical Care, NephroCare Portugal Lisboa, Portugal

Ricardo Peralta  Nursing Care Coordinator
Fresenius Medical Care, NephroCare Portugal Porto, Portugal

Bruno Pinto  Nursing Care Coordinator
Fresenius Medical Care, NephroCare Portugal Porto, Portugal

João Fazendeiro Matos  Country Nursing Director
Fresenius Medical Care, NephroCare Portugal Porto, Portugal