

## Overcoming barriers to implement exercise in the management of hypertensive patients

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### Context

International guidelines recommend physical activity and exercise as part of the daily management of high blood pressure (BP) [1]. Though, a vast gap exists between the guidelines and the actual implementation of physical activity in the life of patients with hypertension. Both the uptake as well as the long-term adherence to an active lifestyle remain a huge challenge [2]. There are numerous barriers to exercise in hypertensive patients with lack of time, costs, accessibility of exercise programs but also health-related co-morbidities and social support cited as major barriers to participation [3]. In search of strategies to

overcome some of these key barriers, isometric exercises show great promise.

### Discussion

Cohen et al. [4] performed a randomised controlled parallel multicentre trial allocating 77 patients with hypertension across seven businesses and clinics in the cities of Bucaramanga and Barranquilla, Colombia. The objective of the study was to compare the effects of isometric handgrip and isometric wall squat training on office BP measured after a 12-week training protocol (phase 1); and [2] to examine BP changes following a subsequent

#### ESH News Corner:

Join the ESH Young Investigators Forum.

The ESH Young Investigator Program was established after the 2022 Summer School in Serbia and is currently in the initial stages of foundation, comprising of a few attendees that expressed interest in setting it up. The ESH aims to involve more young researchers in networking activities. Over the last few months, we have been working closely with ESH Council Members Professor Jan Danser and Professor Jana Brguljan to devise a plan that could benefit all young investigators, particularly those that previously attended the Summer School.

It is with great pleasure that we extend an invitation to all young investigators to join us for the **First Young Investigator Forum on Friday 23rd of June 2023 at the ESH Meeting in Milan**. The current plan is to continue into Milan city centre after the final lecture and have an informal gathering of young investigators for networking. We are looking forward to meeting you in Milan!

The ESH Young Investigator Ambassadors

*(Ryan McNally, Marjet Jetta J. Oppelaar, Petra Sinigoj, Bodil Gade Hornstrup, Costantino Mancusi, Lukasz Obrycki, Yusuf Ziya Sener, Yuling Yu, Justine Huart)*

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**Table 1.** FITT characteristics of the 24 week exercise interventions and their effect on blood pressure.

	Isometric handgrip	Wall squat
Frequency	Phase I: 3 times / week Phase II: 1 time / week	Phase I: 3 times / week Phase II: 1 time / week
Intensity	30% of maximal volitional strength	Wall squat exercise at 125° for the first 3 weeks of the intervention, 115° for weeks 4–6, 105° for weeks 7–9, and 95° for weeks 10–12. Those unable to do so performed the exercise at 135° for weeks 1–2 of the intervention, 125° for weeks 3–4, 115° for weeks 5–6, 105° for weeks 7–9, and 95° for weeks 10–12.
Type	Isometric handgrip with digital hand dynamometer guided by automatic feedback	Squat against a wall
Time	12 min involving 4×2 min of sustained contractions with 2 min rest in between	12 min involving 4×2 min of sustained contractions with 2 min rest in between
Isometric vs control at 12 weeks	SBP: -10.3 mmHg 95%CL (-17.8 to -2.8)* DBP: -2.8 mmHg 95%CL (-8.1 to +2.5)	SBP: -11.7 mmHg 95%CL (-19.3 to -4.1)** DBP: -2.8 mmHg 95%CL (-8.1 to +2.5)
Isometric vs control at 24 weeks	SBP: -10.9 mmHg 95%CL (-18.5 to -3.3)* DBP: -3.9 mmHg 95%CL (-9.5 to + 1.7)	SBP: -14.7 mmHg 95%CL (-22.4 to -6.8)** DBP: -5.3 mmHg 95%CL (-11.0 to +0.32)

Each phase lasted 12 weeks. BP: blood pressure; SBP: systolic blood pressure; DBP: diastolic blood pressure; \* $p < 0.01$ ; \*\* $p < 0.001$  for differences between groups at the end of each phase compared to baseline (adjusted for baseline values).

12-week, “maintenance” protocol (phase 2). Inclusion criteria included adults (35 to 65 years) with unmedicated hypertension (130 mmHg < systolic BP < 160 mmHg). Isometric training was delivered within the workplace during the day under supervision of physiotherapists. Table 1 provides an overview of the interventions. Participants randomised to the control group were provided a link to recommendations for a healthy lifestyle via e-mail.

All 77 participants (mean age 44.9 yrs, 67% male) completed every session of the 24 week intervention, demonstrating high adherence to this intervention. Results are in line with previous findings [5,6] demonstrating large and robust reductions of 11.2–12.9 mmHg in office systolic BP in healthy adults following low intensity isometric training. Moreover, results suggest that the BP reductions could be maintained and even further improved with a single 12-minute session of wall squats per week in the maintenance phase, which from an implementation perspective is intriguing. This would mean that when optimal BP changes are achieved, a low threshold exercise such as the wall squat which could be performed anywhere at any time without any costs might be sufficient to maintain BP reductions. Though, this needs to be confirmed and compared to other exercise modalities in future trials, and mechanisms that underly this adaptation need to be elucidated. In addition, similar to other trials, some limitations warrant a note of caution. First, despite ambulatory BP being the gold standard, this study only included office BP measurements. Previous isometric training studies evaluating ambulatory BP have so far found conflicting results [7–11]. Second, differences in attention and contact with a physiotherapist in the intervention compared with control group could have introduced

bias in the results. Third, whereas the sample size calculation indicated that 144 patients were needed, only 77 were included despite more than 400 volunteers. The lack of a description for non-inclusion leaves questions with regard to reach and uptake unanswered.

## Conclusion

The minimal equipment, low or even no cost, and high accessibility of this intervention make it a more scalable and widely applicable lifestyle intervention. The ESH working group on lifestyle, cardiovascular pharmacotherapy and adherence aims to highlight issues related to implementation of healthy habits and adherence. The current ESH clinical update briefly reports on the results of a randomised controlled trial on isometric exercise and calls for large-scale randomised controlled trials to establish clinical effectiveness on soft (ambulatory BP) and hard outcomes, as well as cost-effectiveness of this type of intervention. If results of these smaller trials are confirmed in larger implementation trials, isometric training might become an important game changer in the lifestyle management of hypertensive patients because its execution is not dependent on time, location, weather conditions, costs and physical restrictions.

## Disclosure statement

No potential conflict of interest was reported by the author.

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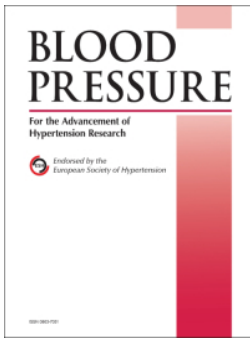
The author(s) reported there is no funding associated with the work featured in this article.

## Key points

- This study adds further evidence for improved outcomes in office systolic blood pressure.
- High adherence rates suggest that this type of intervention has the potential to be easily implemented at any time and place when it's taken up by a patient
- Although the effect is consistent and in line with other studies on the topic, there is now an urgent need for confirmation by means of large-scale randomised controlled effectiveness trials.

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