

Voimaharjoittelun perusteet ja ohjelmointi

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THE "TETRAD" SYSTEM

Kiertävä 4 päivän harjoitusohjelma, jossa jokaisella päivällä eri tavoite:

1. Valmistelevalle päivälle: lyhyitä, intensiivisiä harjoitteita
2. Maksimaalinen kuormitus
3. Lepopäivä
4. Keskiraskas-raskas harjoittelu: esim. painiteknikoita

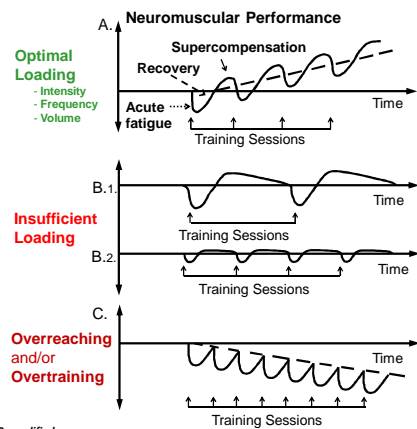
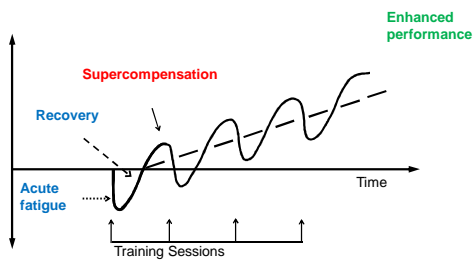
The traditional Greek athletic training system

Philostratos, *Gymnasticus* (jälkeen 220 jkr)

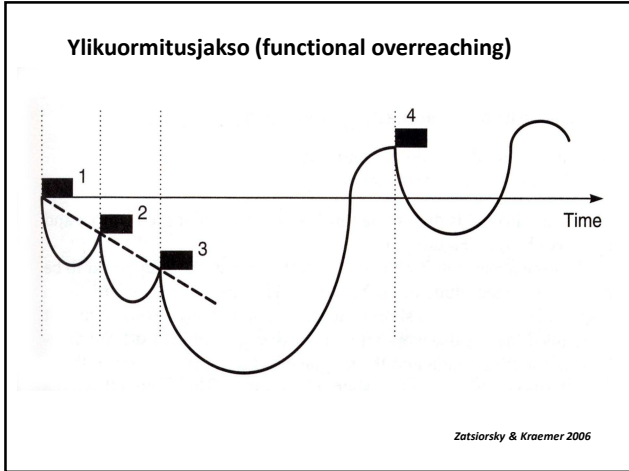
Grivetti & Applegate 1997



Recovery and supercompensation

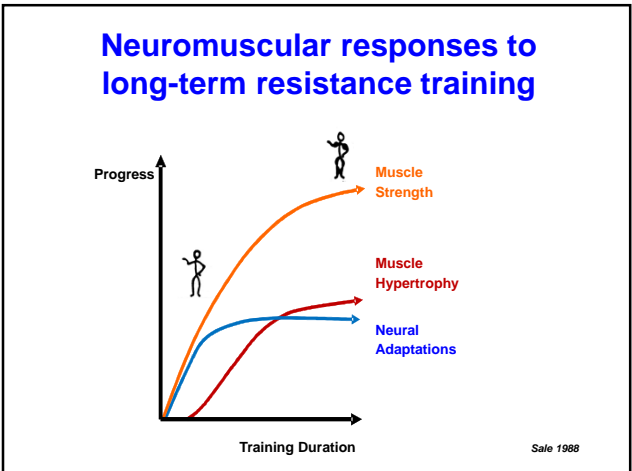


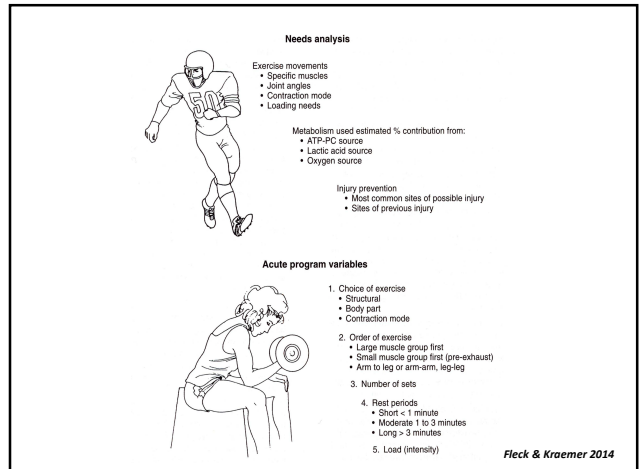
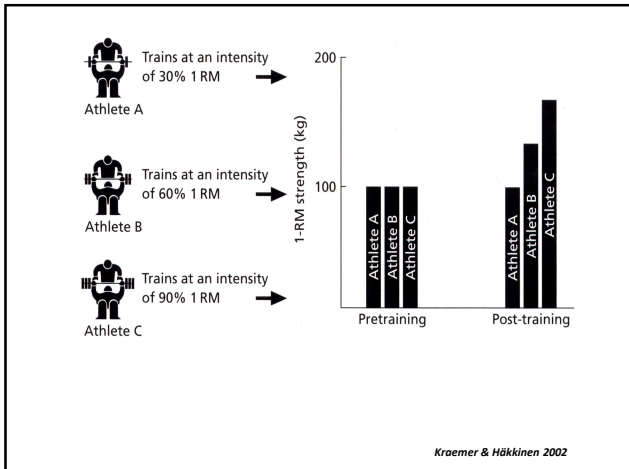
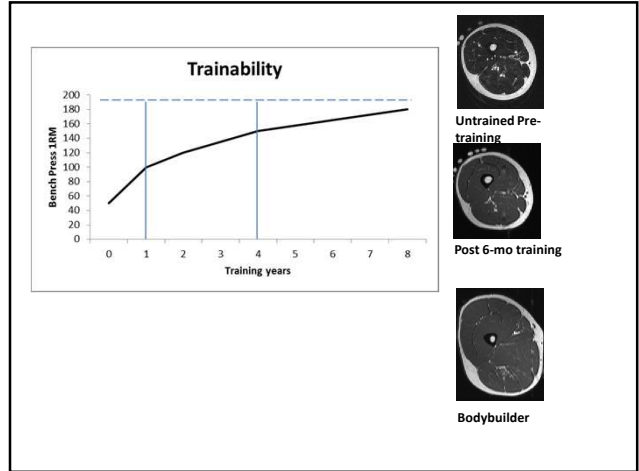
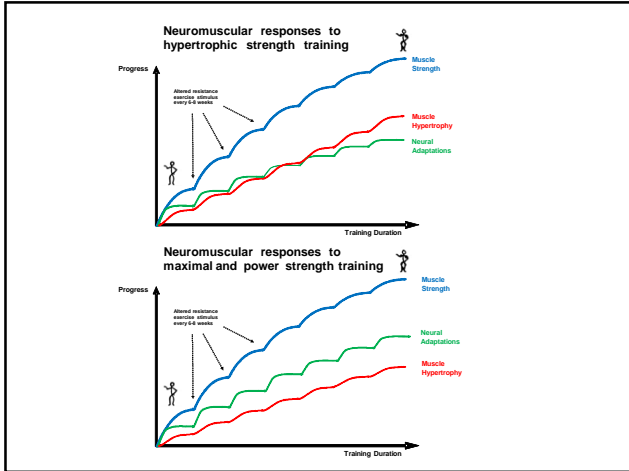
Häkkinen 1990, modified

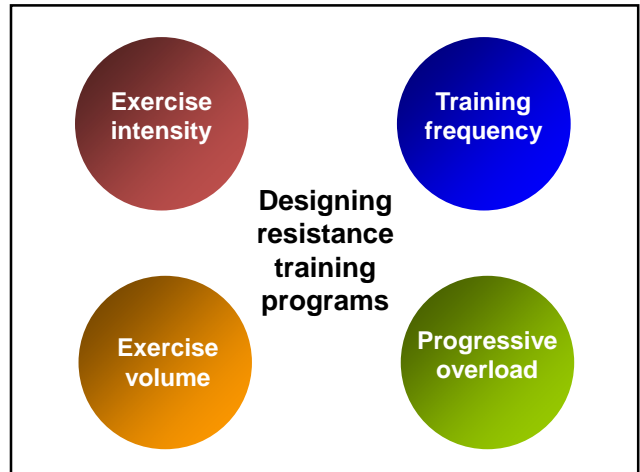
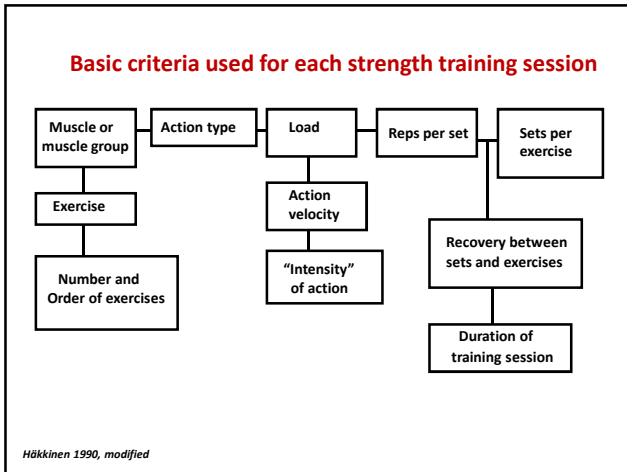


- Training Factors Contributing to Resistance Exercise Overtraining**
- **Training volume and intensity not inversely related**
 - Relative intensity (%RM or RM load) too high for extended periods with little variation
 - Training volume (number of sessions, exercises, sets and repetitions) too high for extended periods with little variation
 - **Inadequate recovery**
 - Failure to account for the cumulative stresses from other forms of training (e.g. sport specific training, cardiorespiratory training)

	Kestovoima	Maksimivoima		Nopeusvoima
		Hyper-trophic	Neural	
Load (%)	30-50	60-80	90-100	30-60
Reps / set	15 →	6-12	1-3	1-10



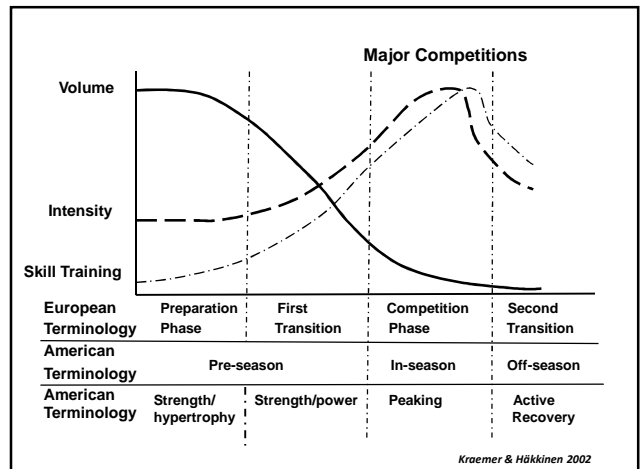


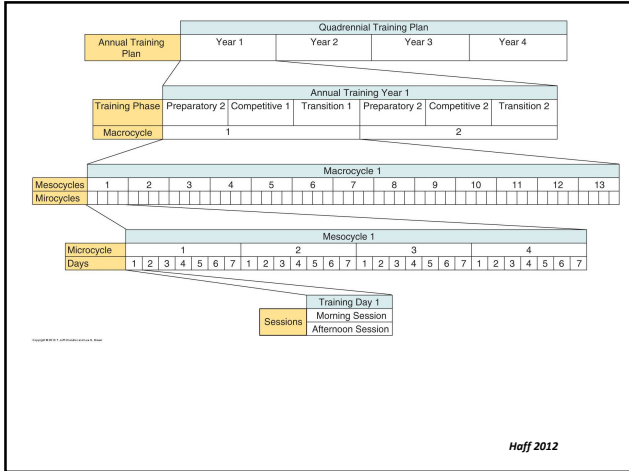


Harjoitusvolyymi
 sarjojen / toistojen / harjoituskertojen määrä (frekvenssi eli useus)

Harjoitusintensiteetti

- suuri kuorma (%RM)
- nopea suoritustapa
- sarjojen suor. viimeiseen toistoon saakka
- (jotain ihan muuta)



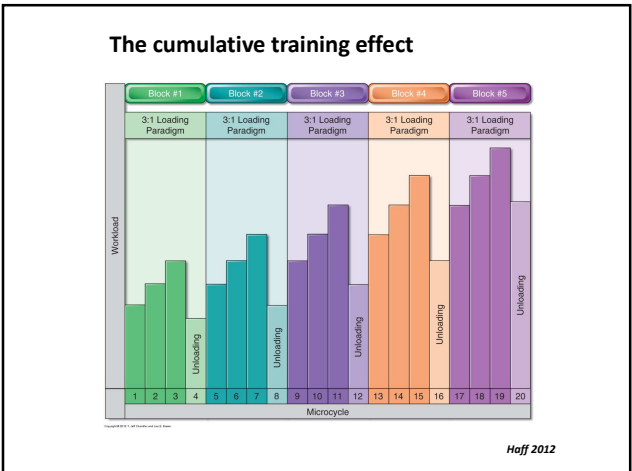
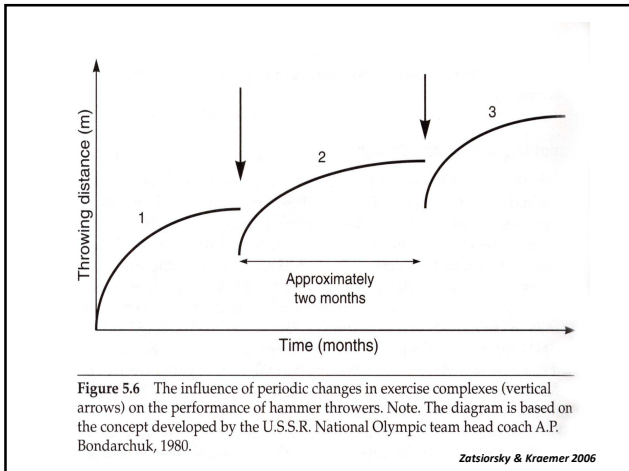


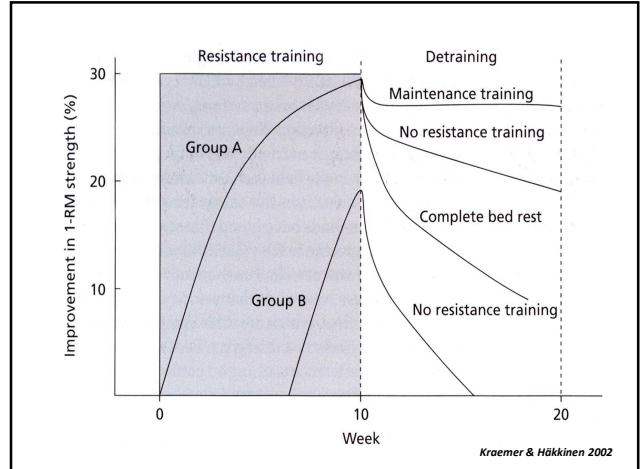
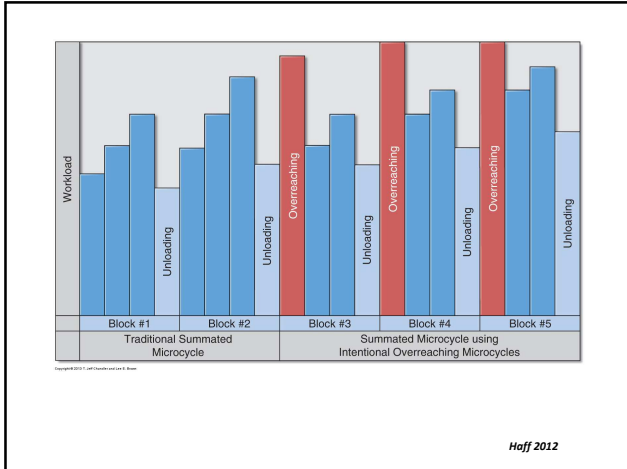
Traditional Strength/Power Periodization Model

Phase:	Hypertrophy	Strength	Power	Peaking
Volume	High	Moderate	Low to Moderate	Low
Intensity	Low	High	High	Very High
Sets	3-6	3-6	3-6	1-4
Reps/set	8-12/20	1-5	1-5	1-4
Rest btw sets	30-60 s	2-5 min	2-5 min	3-5 min
Exercises & choice	Total body & weak areas	Muscles needed in sport	Muscles needing power	Power
Exercise Order	Weak areas first in session	Early in session	Early in session	Early in session

- total duration of the period 12-20 weeks
- specific variations/needs of every sport and athlete

Kraemer & Häkkinen 2002



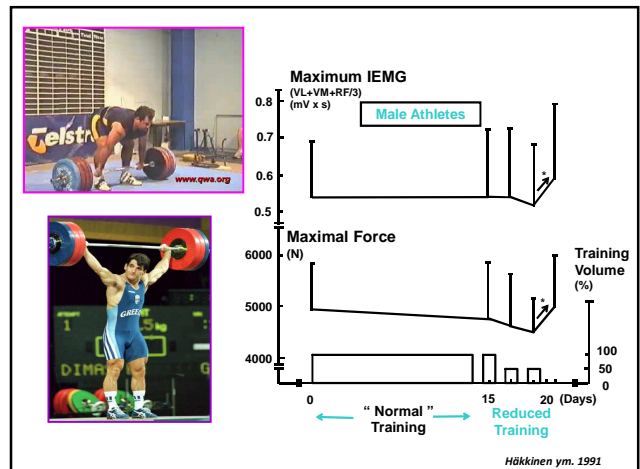


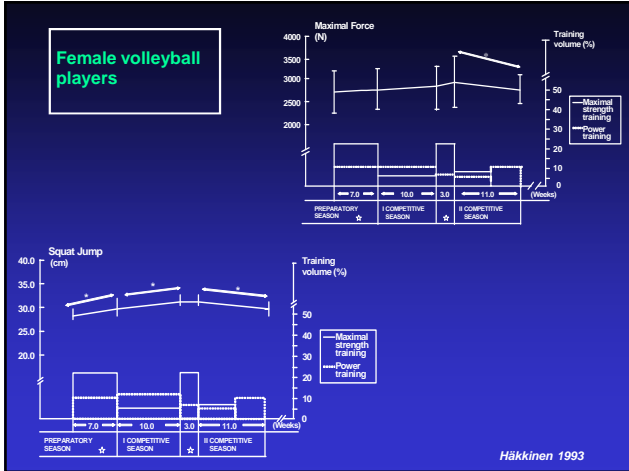
Harjoitteluvaikutusten pysyvyys (Residual Training Effect)

Pitkäkestoisen voimaharjoittelun aiheuttamien muutosten ylläpysyminen tietyn aikaa harjoittelun loputtua riippuu:

- Harjoittelun kestosta ennen taukoa
 - Pitkäkestoinen harjoittelu voi saada aikaan rakenteellisia muutoksia, jotka ovat pysyvämpiä kuin hermostolliset
- Harjoittelun määrästä ja intensiteetistä ennen taukoa
 - Lyhytkestoinen tarkoituksenmukainen yllirasitus (functional overreaching)
- Harjoittelustimuluksista tauon aikana

Issurin 2010



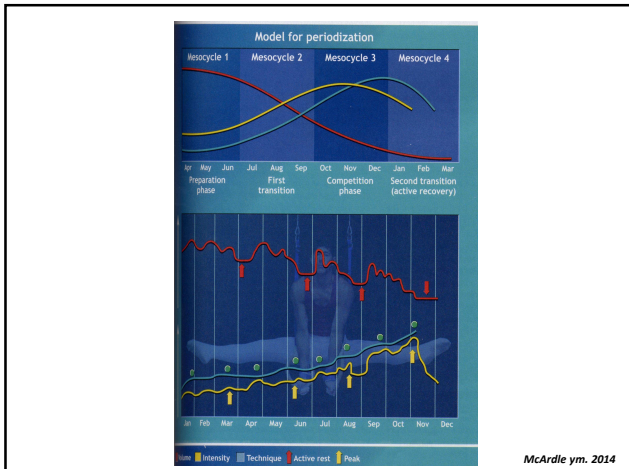


Undulating (non-linear) Periodization Model

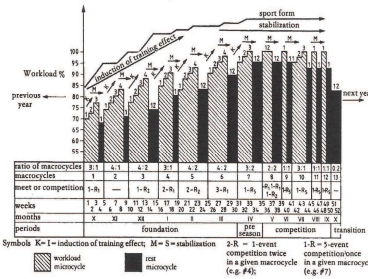
- e.g. for sports with a long season

- aloitetaan yleensä (valmistavan kauden) klassisen voimaharjoitusperiodin jälkeen
- voimaharjoittelu jaetaan toistoalueisiin, esim. 4-6, 8-10 ja 12-15RM (myös 1-3RM)
- yhdellä harjoituskerralla harjoitellaan yhdellä tai useammalla toistoalueella, järjestys voi vaihdella
- toistoalueita käytetään yleensä moninivelharjoitusliikkeissä (esim. rinnalleveto, kyykky jne.)
- jokaisella toistoalueella harjoitellaan (vähintään) kerran kahdessa viikossa

Fleck 2011



Traditional periodization



NADORI, L. and GRANER, Theoretical and Methodological Basis of Training Planning With Special Considerations Within a Microcycle. Lincoln, NE: NSCA, 1989.

Haasteita:

- Suorituskyvyn eri osa-alueita harjoitetaan samanaikaisesti
- Mahdollistaa vain muutaman kuntohuipun vuodessa

Block periodization

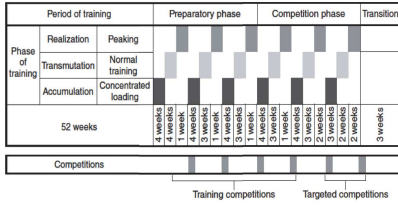
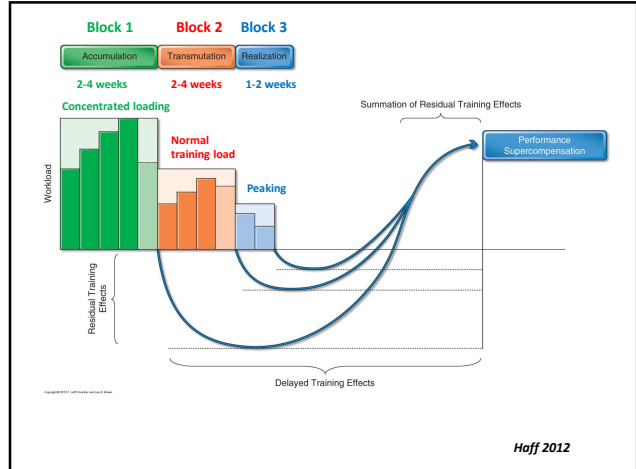


FIGURE 11.12 Example of an annual training plan containing a sequential application of accumulation, transmutation, and realization mesocycles.

Hoff GG and Hoff EE. Training Integration and Periodization, in: *Strength and Conditioning Program Design*. J Hoffman, ed. Champaign, IL: Human Kinetics, 2012, pp 209-254.

- Keskitetään vain muutaman ominaisuuden harjoittamiseen kerrallaan (peräkkäin)
Tehostettu harjoitusjako (ominaisuudet)
-> normaaliharjoittelu (lajinomainen)
-> herkistely
- Useita suorituskyvyn huippuja vuosessa



Hoff 2012

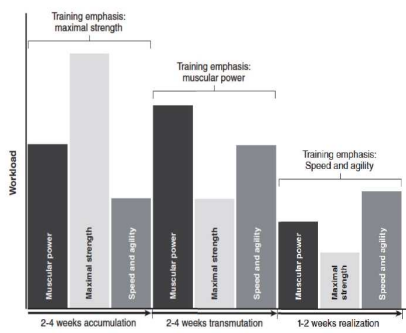


FIGURE 11.13 Example of a sequential application of accumulation, transmutation, and realization blocks for developing speed.

Hoff GG and Hoff EE. Training Integration and Periodization, in: *Strength and Conditioning Program Design*. J Hoffman, ed. Champaign, IL: Human Kinetics, 2012, pp 209-254.



Note: Adapted from Issurin¹, Plisk and Stone² and Bondarchuk³.

Hoff 2012

		Subjects	Training	Finding
Block > Linear	Bartolomei et al. 2014	24 resistance trained men	15 weeks	Greater increase in upper body power (not lower body)
Block > Undulating	Painter et al. 2012	31 resistance trained men	10 weeks	Signif. greater increase in muscular endurance
Undulating > Linear:	Rhea et al. 2002	20 men	12 weeks	Signif. greater increase in 1RM
	Monteiro et al. 2009	27 resistance trained men	12 weeks	No signif. diff. (greater 1RM increases)
	Prestes et al. 2009	40 resistance trained men	12 weeks	No signif. diff. (greater increases in 1RM)
	Miranda et al. 2011	20 resistance trained men	12 weeks	No signif. diff. (Effect sizes greater in 1RM and 8RM)
	Simão et al. 2012	30 untrained men	12 weeks	No signif. diff. (Effect sizes greater in 1RM)
	de Lima et al. 2012	28 sedentary women	12 weeks	Linear for 1RM (ES), undulating for muscular endurance (signif.)
Linear > Undulating:	Apel et al. 2011	42 recreationally active men	12 weeks	Signif. greater increase in 1RM
Linear = Undulating:	Rhea et al. 2003	60 men and women	15 weeks	No diff. in muscular endurance
	Buford et al. 2007	28 recreationally trained men/women	9 weeks	No diff. in 4RM
	Hoffman et al. 2009	51 resistance trained men	15 weeks	No diff. in 1RM or power
	Hartmann et al. 2009	27 resistance trained men	14 weeks	No diff. in 1RM or power
	Kok et al. 2009	20 untrained females	9 weeks	No diff. in 1RM or power

Yhteenvetoa voimaharjoittelun ohjelmoinnista:

1. Klassinen kausijako: Volyyymi ↓ ↔ Intensiiteetti ↑
 - Kestovoima → Maksimivoima → Nopeusvoima
2. "Undulating program", kun eri voimantuotto-ominaisuuksien tulisi säilyä korkealla tasolla pitkään (esim. joukkuelajit)
3. "Block periodization", kun suorituskyvyn huippu halutaan saavuttaa usein kauden aikana

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