Periodisation in Judo Training

by Amos Gil'ad

The term “periodisation” has become a kind of “buzz-word” in sports training, and is both used and misused. This article tries to present the idea of periodisation within the context of Judo training.

What is periodisation? Periodisation is a technique of planning the process of training and competition so that the annual training plan is a succession of “periods”, each of which has a different style of activity. In the basic model of periodisation, there are three kinds of periods: a *Preparation* period, a *Competition* period and a *Transition* period. The most important competition of the year is usually planned for the final part of the competition period.

An annual training plan may consist of one of each such periods; in Judo, experience has led to the use of a so-called “Double periodisation”: a “Preparation period I”, a “Competition period I”, then a “Preparation period II”, a “Competition period II” and finally a “Transition period”.

Why periodisation? The basic idea underlying this concept is the recognition that it is impossible to have an athlete to be continuously at peak readiness, top athletic shape or form – always to be able to deliver his best performance. You can train for such athletic shape, if you do it correctly you will achieve it; then, it can be maintained for some time, but finally you must “let go”, rest, losing some of that peak ability so that you may “recharge your batteries” and, hopefully, go through such a cycle again, if possible – at a higher level.

Periodisation claims to be the procedure which will cause you to be at your best level, to have your highest form at the time of the most important competition of the year.

Who needs periodisation (and who doesn’t)**?** Any competitive athlete goes through 4 stages in the course of his athletic career:

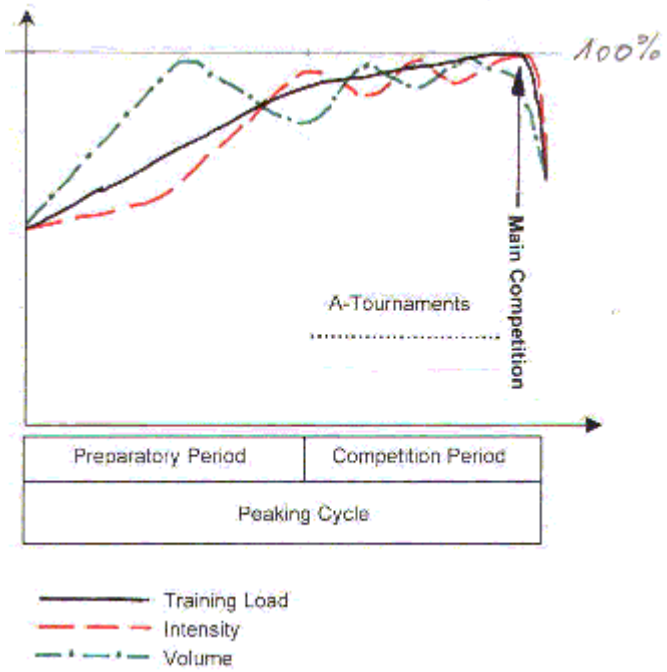
- *The basic stage*, which in Judo would be (in a 6-kyu system) 6. Kyu to 4. or 3. Kyu;
- *The intermediate stage,* in Judo 3. Kyu to 1. Kyu;
- *The advanced stage,* in Judo 1. Kyu to 2. Dan
- *The elite stage,* which can come about from 1. Kyu onwards, but is limited to the talented few.

At the basic stage, competitions are not the goal of training; they serve as a motivational tool, they provide the coach with feedback as to the efficiency of his efforts, but -– in contrast to the advanced and elite stages, they are not the be-all and end-all of Judo. In fact, over-emphasising the importance of competitions at this stage can lead to early success followed by a dead end. Usually this is also the time at which the athlete is at primary school, and scholastic demands and school programs should dictate the level of effort invested in Judo at this stage. To some extent this is also true of the intermediate stage; therefore, periodisation should be introduced during the second half of the intermediate stage.

Obviously, it is at the advanced stage, and even more so, at the elite stage, that periodisation is most called for.

How to form the periods? *(This is the original model of periodisation, presented by Matveyev of the Soviet Union in the late fifties, and developed and modified by many coaches in many sports during 30-odd years)* The basic rules for giving the periods their character are guidelines for the load and content of training. Especially as far as training load is concerned, translating these guidelines into concrete training programs is much easier for measurable sports (such as track and field, swimming, weightlifting etc.) than for a non-measurable sport such as Judo.

Training load is a combination of training volume and training intensity. The preparation period, coming as it does after the transition period, begins with low volume and low intensity. During the preparation period, both volume and intensity increase, but volume increases initially much faster. At some spot, usually slightly after the mid-point of this period, it is impossible to go on increasing both volume and intensity; as intensity has to be increased further, this dictates a decrease in volume. The basic idea is to reach maximum intensity at the end of the preparation period – the beginning of the competition period. During the competition period, both volume and intensity will fluctuate close to their maximum values: as intensity rises, volume decreases and vice versa. As each of the competitions which are the justification for this period's name approaches, volume decreases and intensity rises – and after the competition this trend reverses. This is most pronounced just before the most important competition, and is often termed the "taper", implying that, while intensity rises to its highest values, volume decreases so much that the total training load "tapers off". During the transition period, both volume and intensity will sink to low levels, enabling the athlete to recover from the stress of the previous periods and ready himself for the next "cycle" of training and competitions.



The character of training is determined both by the training load and by its content. We have dealt with the load - now, what about content?

All training content are exercises: drills, games, mock contests, tests – all are, fundamentally, exercises. Some of these are very close to what happens in contest – randori, for example; others are very dissimilar – think of jogging, stretching, weight room work etc. In coaching theory parlance we speak of “specific exercises” when we refer to the first group, and of “general exercises” when referring to the second.

As the athlete advances through the various stages (remember: basic, intermediate, advanced, elite) the content of his/her training, always a blend of general and specific exercises, changes – it gets to be more and more specific. This trend is also seen during the annual training plan: The preparatory period begins with a relatively large percentage of general exercises, and as it approaches the competition period gets to be more and more specific. But, as training volume increases, it may often happen that the actual amount of general exercises does not decrease during most of the preparation period, the decrease in percentage being offset by the increase in volume. During the competition period, the amount of general exercises hits its low – but does not disappear completely; and during the transition period, specific exercises will be totally (or nearly totally) absent.

Nice abstract theory – how do we translate that into Judo? Volume of training in Judo is best represented by the time spent on the mat, or, if one wishes to be pedantically accurate, by the time actually *doing* Judo. The big problem is quantifying intensity.

One way, rather primitive, but enough for a rudimentary application of the theory, is to go by feel and characterise each training session (“training unit” is the usual term in coaching theory) as light, medium, hard or maximal. Beyond the fact that we are here painting with a rather broad brush is the difficulty that both trainee and coach will tend to be influenced by the length of the session when assessing intensity; it is natural to characterise a highly intense but short session as medium or hard, while seeing a lengthy and medium/hard session as “maximal”… There is, in fact, a slightly more sophisticated version of this method, originated by the Swedish physiologist Borg and known as “Rate of Perceived Exertion” or RPE. Here, athletes are trained to perceive intensity on a scale of 5 to 10 degrees (there are different versions of RPE). On the 10-degree scale, intensity is closely linked to heart rate: a rating of 10 would be given to an exercise causing a heart rate of 190 – 200, a rating of 6 to one causing a heart rate of 150 – 160, with 0 being given when heart rate is less than 100. When learning to use this method, athletes are asked to assess their rate of exertion and given immediate feedback as to their actual heart rate; after some time, they will be able to assess intensity quite reliably.

The next step is, obviously, to actually measure heart rate; either by palpitation (usually of the carotid artery, the wrist being less reliable, especially when under the stress of intensive exercise), or by some measuring device, of which the Polar devices seem to be the best as of now. Both

alternatives are not devoid of difficulty: For palpitation you have to stop exercising, get ready, start counting on command, stop on command and report to your coach – which can be quite cumbersome when a whole team is exercising; it is also quite difficult to reliably count, say, 27 beats in 10 seconds (I have found it useful to train athletes to count “by fours”, where those 27 beats would be either “6 fours plus 3 beats” or “7 fours lacking one beat”). The usual Polar device requires the athlete to wear a strap on the chest and a wrist watch; the strap can slip or become undone, the watch can have its strap broken or one of its start/stop buttons inadvertently pressed. Lately, Polar has come out with a bar with a watch mounted on it; the coach approaches the athlete and touches his/her chest with the bar (the device will work through a t-shirt if the shirt is wet, thus evading possible problems with female athletes).

Whichever measuring method is used, experience shows that practically nobody measures heart rate after every drill or exercise; one estimates most of them, using measurement from time to time so as to be reassured that one’s guesses are – and remain – reliable.

A further problem with using heart rate as a measure of intensity is this: Research has shown that heart rate increases linearly with intensity of exercise *when exercise intensity is in the aerobic domain.* When intensity rises beyond the “anaerobic threshold”, heart rate, already close to maximal values, increases more slowly – it has become a less sensitive indicator. A satisfactorily sensitive indicator in this domain is the concentration of lactic acid in muscle, or, slightly less accurate, in blood and/or plasma. But this requires an “invasive procedure”: drawing blood (usually by a pinprick of finger tip or ear lobe). The procedure is also expensive, whether you make use of a lab, or one of the hand-held LA analyzers available: the first alternative is accurate but more expensive, the second faster, cheaper but less accurate.

So, here, too, the practical solution will be to measure periodically and estimate for the rest of the time. Prof. Liesen of Cologne tried training a national wrestling time to assess LA concentration by conducting a week-long training camp in which LA was measured constantly, the athletes asked to estimate their condition and given immediate feedback as to the accuracy of their estimate. They were able to estimate quite accurately their condition, and maintained this ability for some 6 months – after which they were given a “refresher course”. W. Sikorski of Poland used a slightly different approach: Over several weeks, he checked heart rate and LA concentration after all drills used by the national team. Based on this, he constructed a “Catalogue of training means”, consisting of 11 general and 23 Judo-specific training drills, each one with the expected heart rate and lactic acid response. He then used this catalogue both to analyse actual training and to plan ahead. Looking at a graph depicting the training load of the Polish national team in 1980, both on the basis of heart rate and on LA, one sees that peaks and lows of both graphs run in parallell, but the LA has a more sensitive response – except, possibly, during the transition period.

Summing up the problem of intensity assessment and tuning:

- For many purposes, a variant of RPE will be sufficient.

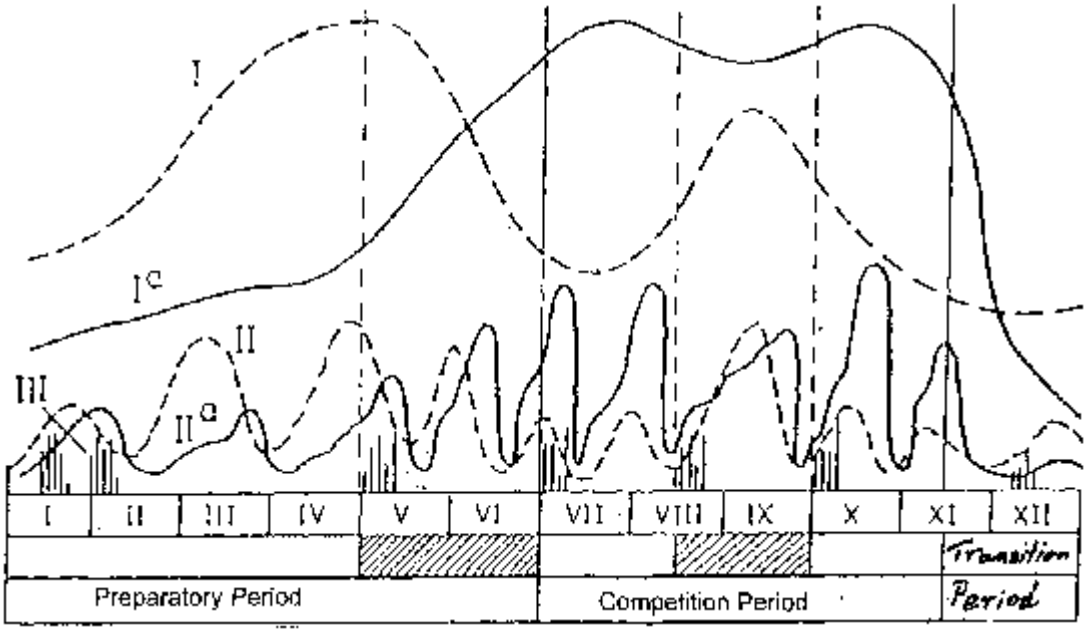
- For more accuracy, needed for elite teams at national level, heart rate assessment – a mix of actual measurement and of educated guesses – will do.
- For “top of the line” work, when most workouts are highly intensive, use LA assessment – one of the two procedures (Liesen, Sikorski) described – or invent one of your own.

For an assessment of overall training load, the accepted method is to treat load as a product of intensity and volume. Strictly speaking, this is not quite true; the point is, that no one has as yet come up with a better idea; so, until someone does, we will go on –

- multiplying the intensity of each drill by the time devoted to it;
- summing all products for one training unit to get the training load of that unit;
- dividing the training unit’s load by its overall time to get the mean intensity;
- summing all training loads incurred in one week (microcycle) to get the training load of that microcycle and by dividing that by overall training time to get the mean intensity;
- using those data both for analysing past training and for planning ahead.

The next step

The foregoing has been a description of what is known as “the Matveyev model of periodisation”, modified over the years and adjusted for the needs of Judo. It was quite revolutionary when first introduced, now it is “a Classic”. For a long time, trying harder meant increasing training load – both volume, and for Judo especially, intensity. When the limits of human ability were approached, coaches and their guides turned to ergogenic aids. This is now more or less a dead end. So sports scientists are looking for new ways in planning training. While the Matveyev method is still a mainstay of training plans, new approaches are being tried.



Matveyev diagram, depicting a 1-peak annual cycle:

I -denotes overall volume Ia – intensity II - is the volume of the mesocycles IIa - the corresponding intensity

III - denotes microcycles

One possible way is to individualise planning. One theory (Bondarchuk) holds that, at least for sports relying on explosive strength, there are 5 or more types of athletes, differing in the time they need for converting training gains into enhanced competitive performance. For each such type, a different training timetable is needed to bring out the best. Diagnostic methods will have to be developed to identify to which type each athlete “belongs”; then, the national coach will have his work cut out for him to coordinate the various individual training plans into a viable team plan…

Another approach (Verkhoshansky) speaks of “delayed training responses”, claiming that by imposing extremely high volumes of training, leading to a lowering of performance – but not to a total collapse due to overtraining (and that can be a very fine distinction!) – and then reducing volume sharply but going to high intensity, very high gains in power will be achieved after some 6 weeks. Here, as with the approach described in the previous paragraph, there are still many question marks to be resolved.

Endurance sports have been using “altitude training” in the form of training camps at elevation of 2200m – 2800m above sea level, 3 weeks at a time, to enhance aerobic endurance beyond what is attained by usual methods; lately, power sports such as Judo have found use for such camps too, at the beginning of the preparation period to lay a good foundation for the high training loads needed during the later parts of the peaking cycle, and sometimes also some 2 months before the most important event of the year, to refresh aerobic endurance before the “final spurt” of melding all training components.

There seems to be overall agreement that more attention needs to be paid to recuperation. One procedure has been, to monitor, during high intensity training weeks, the content of phosphocreatine kinase content in each athlete’s urine both in the morning and before bedtime. PCK concentration is a good indicator of summed training loads and muscular microtrauma. Thus evening level is always higher than morning level. The difficulty is that values are highly individual. The guiding principle that was developed claims that if during the night PCK level decreased by more than 50% of the previous day’s increase, training may continue as planned; but if the decrease was less, a day of low-level training and rehabilitation means must be inserted. This is but one example of many other biochemical markers which are being explored as to their possible diagnostic value for tuning training load.

I wish to stress that all of these “new avenues” have not yet reached maturity; and in any case they are not to come instead of the Matveyev method, but to be considered by those who have used that method and may be outgrowing it.