

THE COUNTERVIEWS

प्रतिमत

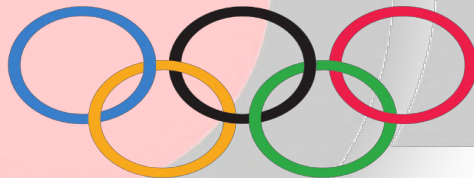


DECEMBER 15-31, 2019 (REPRINT 2020) | ISSUE 1:02 | RNI CODE : 2019035554

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TOKYO 2020



23 JULY TO 08 AUG 2021

INDIAN AMBITIONS OF MEDALLION

TOPIC 01

Indian Aspirations for
Olympic Medallion :
Tokyo 2020.

The Problem areas in
Indian sports

TOPIC 02

Scientific basis of
Selection & Training

Some Training tips for
Sprints and Weight-
lifting

Categories of Sports

Scientific basis of
Selection & Training

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"सम्पादकीय"

'खेल-खिलाड़ी मन्तव्य'



"पढ़ोगे लिखोगे बनोगे नवाब, खेलोगे-कूदोगे बनोगे खराब,"

इस तरह के फिकरे अब सुनने में नहीं आते तो क्या अब खेल के प्रति दृष्टिकोण बदल गया है ? संभवतः बहुत ज्यादा बदल गया है, परन्तु अभी खेल के क्षेत्र में खिलाड़ियों को कुछ करने के लिए बहुत मेहनत करनी है

। आज से चार दसक पहले तक खिलाड़ियों को कई स्तर पर संघर्ष करना पड़ता था । पारिवारिक, सामाजिक और खेल के क्षेत्र में भी विभिन्न स्तरों पर, जो कि हर खिलाड़ी के लिए स्वाभाविक है ।

महिला खिलाड़ियों के लिए ये संघर्ष और भी कठिन होता था,..... शायद आज भी है । माता-पिता लड़कियों को खेल के क्षेत्र में भेजने से ज्यादा बनी-बनाई लीक पर एक सुरक्षित, सुसंस्कृत, सामान्य पारिवारिक जिंदगी में उन्हें जीते रहते देखना ज्यादा पसंद करते हैं । सामान्य तौर से देखें तो पाएंगे कि आरंभिक दौर में हमारी महिला खिलाड़ियों ने काफी मेहनत से समाज में और स्पोर्ट्स में अपनी जगह बनाई है, चाहे पी.टी.उषा हो, आरती साहा हो, कंवलजीत संधू (1970) या अन्य हो ! परन्तु इन महिलाओं ने एक ऐसे दीवार को तोड़ा जिसके कारण आज हमारे यहाँ मेरी कॉम, गीता फौगाट, साइना नेहवाल, दीपा कर्मकार, साक्षी मलिक, हिमा दास और अन्य बहुत से हैं । सानिया मिर्जा के ड्रेसकोड पर तंज करना भी हमारी सामाजिक मानसिकता को ही दर्शाती है ।

पुरुष वर्ग में टीम इन्डिया(1950) जूतों के अभाव में वर्ल्डकप में क्वालिफाई करने के बावजूद नहीं खेल पाई थी जो स्पोर्ट्स के प्रति सरकार की उदासीनता का जग जाहिर प्रमाण है, आज भी बहुत गरीब और सुयोग्य खिलाड़ी चयनकर्ताओं की नजरों में आने से चूक जाते हैं । पुरुष वर्ग में यद्यपि बहुत से पुराने और नए खिलाड़ी हैं, जिन्होंने बहुत से मैडल भी लिए हैं, लेकिन पारिवारिक और सामाजिक संघर्ष महिलाओं की तुलना में अपेक्षाकृत कम होने के बावजूद भी विश्वख्याति में उस ऊँचाई तक नहीं पहुँच पाए हैं, जहाँ उन्हें होना चाहिए ।

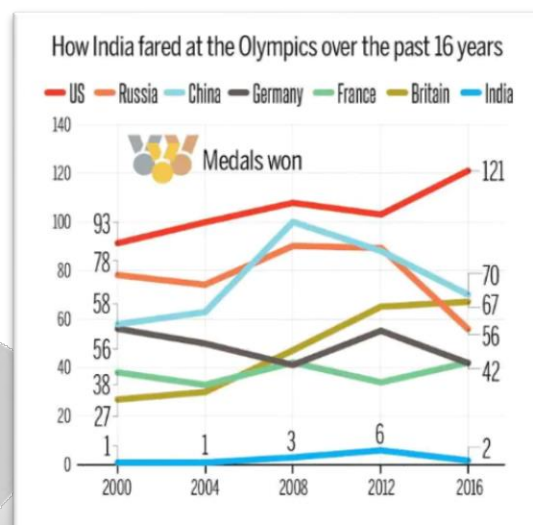
व्यक्तिगत क्षेत्र में गोल्ड मेडल लेने वाले अभिनव वृंदा की बात मैं नहीं कर रही हूँ, उनकी जिंदगी में आर्थिक संघर्षों की या रोजी-रोटी की समस्या या यूँ कहें कि गुजारे की समस्या से जूझने के साथ-साथ ही स्पोर्ट्स के क्षेत्र का संघर्ष नहीं है । सरकार अगर आज खिलाड़ियों को सुरक्षा, सहायता एवं प्रशिक्षण दे रही है तो क्या सही अर्थों में वह सुयोग्य खिलाड़ियों तक सही तौर में पहुँच पा रही है ?

मेहनत, दूरदर्शिता, प्रशिक्षण के साथ-साथ सटीक, सुयोग्य खिलाड़ियों का ईमानदारी से चयन की आवश्यकता ही स्पोर्ट्स के क्षेत्र में भारत के भविष्य को उज्ज्वल बना सकता है ।

भौगोलिक एवं जनसंख्या के क्षेत्र में बहुत बड़ा गणतन्त्र होने के कारण एशियाड, कॉमनवेल्थ के अलावे ओलिम्पिक गेम्स के विभिन्न खेलों में भी खिलाड़ी आशाजनक मेडल उपार्जित कर पाये इसलिये आवश्यक है कि हर इलाके में सूक्ष्म प्रेक्षक हो, स्वार्थ रहित, ईमानदार अनुभवी चयनकर्ता हो, प्रशिक्षक हो एवं मेहनती, ईमानदार, दृढ़निश्चयी खिलाड़ी भी हो ।

Indian Aspirations of Olympic Medallion : Tokyo 2021

Indian performance at Olympics ever since its inception, has been abysmal. Among other factors, absence of desired genotype & anthropometric considerations in selection and not following a science-based trainings have been significant. The national sports policy 2001 did did bring some changes in the thinking at the highest level. Among other measures it broadened the base for the sports, linking it to education, creation of sports federations, new facilities better coaches and also introducing a scientific footing in sports. However, performance in 2004 Olympics only revealed that not much foot-hold could be gained by the steps taken for varied reasons. Modi Govt in 2016-17 constituted a Task Force to recommend adopting new measures esp directed to the next three Olympics. The govt did not delay implementing those measures but the efficacies are not truly convincing. This article highlights some of such issues which apparently are on the other side of the coin.....



Indian Steps on Olympics Podium...an overview

India's tryst with Olympic medals have always been circumspect : Lot of enthusiasm and hypes created before the events invariably culminating in to disappointments. An occasional flicker of hope on to the podium doesn't speak much for our country of >1.3 billion. Thanks mainly to Hockey in early decades that India got a medal. Emergence of Shooting, wrestling, boxing and badminton events in recent times has been saving India from embarrassments, giving us few medals since 2008 Olympics. Our abysmal Olympic medal tallies (G-gold, S-silver, B-bronze) over seven decades are shown in Table-1.

Table-1 : Olympic Medals won by India

Year	Events	Athletes	G	S	B	Total	Year	Events	Athletes	G	S	B	Total
1948	10	79	1	0	0	1	1984	5	48	0	0	0	0
1952	11	64	1	0	1	2	1988	7	46	0	0	0	0
1956	8	59	1	0	0	1	1992	5	53	0	0	0	0
1960	6	45	0	1	0	1	1996	13	49	0	0	1	1
1964	8	53	1	0	0	1	2000	7	65	0	0	1	1
1968	5	25	0	0	1	1	2004	14	73	0	1	0	1
1972	7	41	0	0	1	1	2008	12	56	1	0	2	3
1976	2	20	0	0	0	0	2012	13	83	0	2	4	6
1980	4	76	1	0	0	1	2016	15	118	0	1	1	2

In the entire history of Indian participation in Olympics both before and after our independence, India has participated 24 times and won a total of 28 medals. It is beyond

imagination how track & field and water sports having so many medals at stakes, have been eluding us. The total events/sports wise medals won by India is shown in table-2. This indirectly means that India possesses significant talents and skills in those sports/games. Hence its participation in those events in future too will remain well justified. However, the sports in which Indian team has not progressed beyond the 1st heat stage, one may have to review participation. The number of total events in Olympics have increased from 9 in 1896, 26 in 2012, 28 in 2016.... to 33 events scheduled for 2020 where it features 5 new sports (Baseball/softball, Karate, skateboard, sport Climbing & surfing) of which one is familiar in India too. In all future Olympic team selection, one question of ‘winning ability’ must also be asked. Winning ability is decided by performance levels in international competitions having reasonably higher standards of participating athletes. A personal best record comes the next. In track & field, water sports as well as weight-lifting personal best records of Indian athletes, lag far behind and possibilities of getting medals are rather bleak unless the selection & training methods are improved drastically and the personal best records are brought very close to the Olympic records.

Table-2; Indian Olympic Medals by Sports

Sport	Gold	Silver	Bronze	Total
Field hockey	8	1	2	11
Shooting	1	2	1	4
Athletics	0	2	0	2
Wrestling	0	1	4	5
Badminton	0	1	1	2
Boxing	0	0	2	2
Tennis	0	0	1	1
Weightlifting	0	0	1	1
Total	9	7	12	28

The way sports were viewed earlier...

The sports in India were traditionally considered ‘recreational’ with very few having professional aspiration till the last few decades. We lacked advanced infrastructures & facilities of competitive sports and its promotion in rural / small cities were very limited. As a result the selection was from among who showed-up at the national games, unable to be trained optimally for required duration and levels to be a medal prospect. In the last few years however, a

Table-3 : Performance Records in Track & Field events

Men's Events	Indian Record	Olympic Record	Men's Events	Indian records	Olympic records
100 metres	10.26s	9.63	High jump	2.25 m	2.39 m
200 metres	20.45s	19.30	Pole vault	5.13 m	6.03 m
400 metres	45.40s	43.03	Long jump	8.19 m	8.90 m
800 metres	1:45.77s	1:40.91	Triple jump	17.30 m	18.09 m
1500 metres	3:38.00s	3:32.07	Shot put	20.69 m	22.52 m
5000 metres	13:29.70s	12:57.82	Discus throw	66.28 m	69.89 m
10000 metres	28:02.89s	27:01.17	Hammer throw	72.86 m	84.80 m
Marathon	2:12.00s	2:06:32	Javelin throw	86.48 m	90.57 m
110 m hurdles	13.59s	12.91	20 km walk	1:20.21s	1:18:46s
400 m hurdles	49.51s	46.78	50 km walk	3:56:22s	3:36:53s
3000 metres steeplechase	8:30.88s	8:03.28	4 × 100 m relay	38.89s	36.84s

Figures in **Red** show possibilities of medals with adequate training

national sports policy has been initiated on a wider platform of promotion and selection through “*Khelo-India*” involving all schools (rural & urban) with some added incentives that showed immediate result at the 2018 Asian games but many of the games records were much too short of Olympics medal aspirations. Table-3 shows a performance yardstick for Olympics medal hope. The figures shown in red represent the values in which if more attention is paid in the scientific basis of selection and training, we could hope for a medal in a shorter span of time.

Past performance of athletes in sports are seldom useful but for the 'event records' which though always subject to be broken by a new one, are of immense value as a yardstick for training goals of the athletes. A look at our Indian records vis-à-vis Olympic records (Tables 3 & 4) reveal wide gaps and explains why we are unable to even qualify beyond elimination rounds, semi-finals or finals, leave alone the podium finish. It is no surprise that we seldom stood a chance in the past and if our selection & training continues as it is, there are hardly any scope for sudden jump in the medal tallies in near future too. These performance parameters serve as a very important training goal.

Table-4 : Performance Records in Men & Women weight-lifting

Wt Categories Kg	Men's Weight-Lifting				Wt Categories Kg	Women's weight-lifting			
	Indian Record		Olympic Record			Indian Record		Olympic Record	
	Snatch	Clean & Jerk	Snatch	Clean & Jerk		Snatch	Clean & Jerk	Snatch	Clean & Jerk
56	119 Kg	147 Kg	137 kg	170 kg	48	84 Kg	107 Kg	97 Kg	117 Kg
62	126	152	153	177	53	90	115	101	131
69	146	175	165	196	58	93	119	110	138
77	152	187	177	214	63	105	127	115	147
86	154	187	185	217	69	110	130	128	158
94	154	191	187	226	75	111	138	131	161
105	161	191	200	237	75+	112	147	151	187

Figures in Red show possibilities of medals with adequate training

This is a yardstick for the coaches to ponder how to get the training goal near the event records if not over it. The figures in red show a few events where our national records are fairly close to the Olympic records in which our athletes can hope for a medal if special (science-based) efforts in selection & training are made on the probable. Some amount of 'spot performance surge' do happen during the actual events (owing to high adrenalin, high stakes and a sheer motivation) but only over a narrow margin. So what are the problem areas in Indian sports?

The Problem areas in Indian sports

Lack of awareness of the various types of sports & games being played in a particular region at various levels among the people (all included). Very few of the rural youth are aware of many competitive events. Of late, of course, TV has made the awareness so some level.

The parents/guardians feel it a waste of time & effort of their wards. Only a few fancied sports events have captured the imaginations of the youth whereas many other sports suffer identity crisis and promotional indifferences.

Lack of Career prospects. Youth in sports often have to fall out of the higher education or leave the sports to compete the curriculum. Even if someone pursues sports, there is hardly any career prospects during or after his active phase. Therefore a mandatory sports quota in educational instt of repute are needed for the probable at the places of their training.

Lack of Sports Infrastructures. Insensitivity of successive govts in the country towards sorts had been a sad affair. Rajiv Gandhi was the first to enhance the budgetary allocation by almost 8 fold in 1987 followed by Bajpayee govt who increased it by 2.5 times in 2002. Even basic infrastructures for various sports & games were lacking at the villages, Panchayat, Schools & colleges levels.

Sports Budgets in 5 yr plans	In Crores
VI (1982-87)	26.56
VII (1987-92)	207.45
VIII (1992-97)	210
IX (1997-2002)	472
X (2002-07)	1145.36

While it may not be possible to have advanced facilities at periphery, basic infrastructure can be made with reasonable investment and that has been the problem in our country. Along with the govt, even corporate sectors must take responsibilities. It was in 2016 that sports in India was given a status of Industry and the budget allocation of sports increased many folds in 13th 5 yr plan.. Investment in infrastructures of stadia and other facilities, sports goods manufacture, opening of sports academics, scientific training, holding of international championships etc will surely propel India's chances of gaining prominence. We only hope that India will now excel in sports.

Lack of Institutions of par excellence. The teaching institutions in sports were non-existent in our country. Sports authority of India and a few sports federations were the sole agencies. The type of training they imparted, were evident by the medal tallies of our nations in various international championships. With no intention to criticise them, it must be confessed that their knowledge domain in most sports & games can be termed anything but “par excellence”. They were little receptive to new ideas, new methods, new technologies and new suggestions. As a result, as many nations progressed in their methods of selections and training, we lagged behind as evident in our achievements.

Lack of specialised Coaches were a common factor at the districts and lower levels. Even some of the state sports bodies did not have qualified coaches as they could not afford paying requisite remunerations. Besides, availability of high quality coaches in the country having self experienced either a podium finish in Olympics / World championships or enabling/coaching participants / teams to such podium, are highly deficient. They only know what type of preparations are required in medallion aspirations and are able to exercise those coaching skills effectively.

Lack of special nutrition / diet has been equally hampering the capabilities and performance of our sports persons and probable athletes. A very rich & nutritious diet is mandatory for all physical and physico-technical sports to develop the power, speed, stamina that were hardly ever been made available to them. Some sports demand a very high calorie diet during trainings and while participating in the events.

Lack of means. A youth from poor family may not be able to bear the cost of even basic sports kits for competition. Such people, even if having extraordinary merit, will not come in to the eyes of the selectors. Of late, there was some news that a University Hockey team did not have shoes and sticks while going for competition.

Remunerations / Scholarships for those who are really medallion prospects at international levels of competition is another requirement. Of course, **Khelo India** has taken care of it but it must ensure that the tax-payers' money go to the deserving ones, selected scientifically, on the basis of performance and free of any personal biases whatsoever. Here comes a riddle. Modi govt has steeply hiked the sports allocations right from its first year.

In order to **redress the problem areas** many improvement have happened:-

1. Awareness to sports & games have surely enhanced in recent years. Exceptional sports persons are increasingly choosing it as careers.
2. Sports infrastructures at various levels permitted with substantial funds.
3. Setting up of new sports Institutions of par-excellence.
4. Remunerations for the coaches have been enhanced by 250% upto Rs 75000/pm.
5. Special nutrition/diet ranging upto Rs 650/day and upto Rs 700/day of supplementary charges.
6. Every sports person representing at various levels are paid for sports kits on yearly basis.
7. All international events medalists get cash awards (upto Rs 75 lakh) and pensions ranging from Rs 3000 to Rs 10000/pm.
8. Sports persons at all levels are eligible to Scholarships.

Thereafter, based on the task force recommendations there are steep hike on almost all accounts. Hike in infrastructure development will always remain an asset in the training & promotion of the sports. Steep hike in scholarships for the selected sports-persons and their daily expenditures are also welcome provided its reaching the individuals. Steep hike in the remuneration of the coaches are welcome but are these deserving coaches who can fulfil the nations medallion aspirations? There are also pensions to the ex-sportspersons which is welcome step but one can only hope that there are no biase in their nominations. It can be hoped that India has taken a major leap in invetments in sports and results should be expected in near future.

Financial Year	Budget allocation
2014-15	1769
2015-16	1541
2016-17	1592
2017-18	1943.21
2018-19	2196.36
2019-20	2216.92

Lack of transparent and Scientific selection at the peripheral levels covering the nukes & corners of our country are the root cause of suitable persons being picked-up as probables. Reasons for it are many, incl favouritism & nepotism. The new sports policy tries to address this issue by starting a pan-India school games but what if that material is a school dropout for some reason? Further, the one who stands 1st or 2nd position at the school / state / national level competitions, need to be given due scientific considerations in selection. For example, the Khelo india School competition this year shows that many boys coming 1st or 2nd in various events are 17 yrs old. The one coming 3rd or 4th may be 14/15 yrs, having better body phenotype or anthropometric constitution, have greater scope for performance improvements by training. **Final Selection must be only merit based, of fit athletes only.** If any person is having an injury likely to affect one's performance, he/she must be screened out of the competition. We have seen injured competitors accompanying the team with sorry state of performance. Sports medicine specialist must play his due role, free of any admin pressures, collateral considerations or biases.

Body phenotype or anthropometric constitution are of greatest importance in the selection. It forms the 'X' factor for all physical sports. Leg-length becomes crucial in runs, jumps; Arm-lengths in boxing, swimming (incl palm length & breadth); some other anthropometric parameters relevant in some sports are mentioned in the table-5 below. Parameters shown in red have higher relevance in one's performance. These parameters are **inclusion factors**

Table-4 : Useful Anthropometric Parameters in some sports

Sports	Ht	Arm Length	Palm area	Leg Length	Foot Length	Shoulder Length	Trunk length
Sprints	+++			++++	+++		
High Jump	+++			+++	+++		+
Long Jump	++			+++	+++		
Swimming	++	++++	+++	++	+++	+++	++
Wt-lifting	-	--	+	++	++		--
Shot-put	+++	++++	++	++	++	+++	++
Discus / Javelin/ Hammer	++++	++++		+++	+	+++	++++
Boxing	+++	+++	++	++	+	+++	
Wrestling	+	+++	++	-		++	++
Racket	+++	++++	+	+++	++	+	++
Archery	+	++				++	

in the selection ie. if there are 5 candidates from whom 1 or 2 Olympic probable are to be selected, the anthropometric parameters become important for success. Anthropometric measurements can easily be taken on a low cost "Modified Moran's board". Equally important is some **exclusion factors** of diseases & deformities in body & limbs. Ailments limiting physical capabilities and deformities like flat-foot, knock-knees, kypho-scoliosis of spine and recurrent dislocations of joints may better be screened out during selection.

Categories of Sports

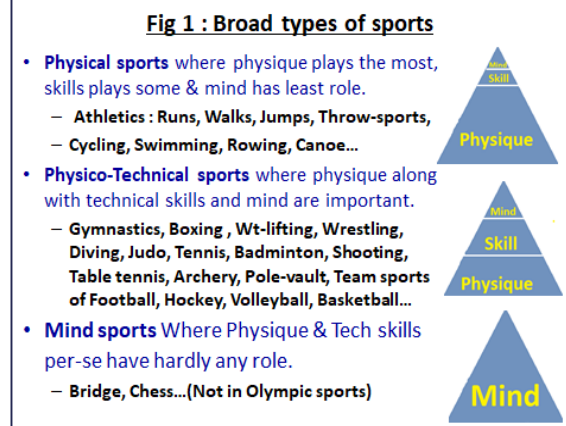
The Olympic sports events may broadly be categorised as *Physical or Physico-Technical* as shown in the figure-1, most being a mix of the two. Table-6 below highlight the possible extent of

Sports	Physical factor	Technical skill	Mind application
Athletics	++++	++	++
Wt-lifting	++++	++++	++
Boxing	++++	++++	+++
Wrestling	++++	++++	+++
Shooting	++	++++	+++
Table tennis	+++	++++	+++
Archery	++	++++	+++
Badminton	++++	++++	++++
Gymnastic	++	++++	++++

applies 2, 3 or 4 '+' in any given event but there is no doubt that it represents the extent of one's Physique, Technical skills of the mind application in that order.

Physical sports. In these sports, performance depends upon the physical constitution of ones' body built with some skill elements too. The body built constitutes both the body framework (lengths & breadths) and the muscles (both types and mass). The **Fast-Twitch (FT) muscles** (Type-II) act in spurt (explosive) movements (short distance running-cycling-swimming, jumping, throw sports etc), whereas the **Slow-Twitch (ST) muscles** (Type-I) are known for its endurance (marathon/ long distance running-cycling-swimming, walk). Hence, it is very

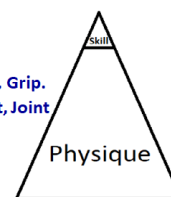
important to know the predominant constituent muscle type in a person (Phenotypes) before one's selection for a given sport. This can be done by actual performance in the given sports, offering saliva tests to determine children's ACTN3 makeup and biochemical genetic profiling through myocyte enhancer factor 2 (MEF2) proteins and Calcium-dependent Ca^{2+} /calmodulin kinase activity may be useful. In doubtful cases testing one's muscle biopsy for number / density of mitochondria in the myofibril are also done. Studies show that the body's muscle-fiber production depends on which variant (X or R) of the gene ACTN3 one possesses. Two copies of X-variant of the gene produces a bounty of slow-twitch fibers having predisposition for endurance sports, while two copies of the R variant lead to an overproduction of fast-twitch fibres for speed. These muscles act on body frames which must yield optimum performance. These body frames come under **Anthropometric parameters** and are considered X-factor of success. For example, a person having longer legs will perform better in running than a person having shorter legs even if both are of the



importance of the Physical & Technical factors in various Olympics sports as well as possible mind applications these sports as represented by the numbers of the '+' marks. One '+' shows the least application and four '+' shows the maximum. One may however, argue whether a particular event

Physical Sports : the X-factor

- Where Physique with specific anthropometric characteristics play the 'X' factor
 - Sprints, Jumps, Endurance, Swimming
 - Ht, Wt, BMI, skin-fold thickness.
 - Leg lengths, Arm length, Shoulder, chest'
 - Step Length, Foot length, Palm Length & breadth, Grip.
 - Exclusion factors (knock knee, club foot, flat foot, Joint injuries to limbs or spine, sesamoid bones).
- Phenotypes of the body composition.
 - Type I or II muscles, VC, VO₂ max rating
 - Max CO, speed/power output, lactate threshold evaluations



same Type-II phenotype muscle constitution (refer the tables on anthropometry above). Similarly, a comparatively shorter trunk & arm-length subject will have better prospects in weight lifting. A boxer with tall height and longer arm-length will have much more impact on his opponent. This is why knowledge of both phenotype and anthropometric considerations get importance in scientific selection. These physical performance based sports are mainly athletics track & field (mainly running-cycling-swimming-walking etc) having numerous medals at stake.

Physico-Technical Sports where the physique, technical skills as well as application of mind in differing proportion yields success. This category of sports forms the majority of competitive individual and team events like weight-lifting, wrestling, boxing, Shooting, Table tennis, Archery, gymnastic and so on. Water events of Diving and synchronised swimming are also a physico-skill sports having many Olympic medals at stake. Thus incorporating a logical mix of physique and technical skills in these sport will surely augment one's performance and increase medal prospects.

Scientific basis of Selection & Training

The author is no expert selector or trainer in any sport. However, by virtue of being a sports person, a doctor and a scientist, a few general and science-based problems/solutions are being emphasized which can make substantial difference in the performance and medal prospects.

Selection. A wide publicity is must in the visual media to increase local participation with some selection tips at the screening levels (in villages, panchayats, schools, colleges). This will facilitate selection of *athletes from wider sections*, both rural & urban, educated & uneducated, trained & untrained. Selection should also include a wide groups of ages to choose from (12-14yr, 15-17yr & 18-20yr for all sports except Gymnastic for which 9-11yr, 12-14yr & 15-17yr are better). The recent plank of "*khelo India*" does include the under-17 yrs athletes from school levels all over India but leaves out those who don't go to school or the drop-outs. It is a good initiative by the govt but how it translates in to practice, remains to be seen. All the same, it surely widens the horizon for selection & training of meritorious sportspersons. Among the near equal performing trained & untrained, lower & higher ages individuals, the untrained and lower age candidates have the edge to perform much higher after training compared to the other group.

भारत को ओलंपिक्स १००/ २००/४०० मी दौड़ में मँडल कौन दिला सकता है ?

वह किसी गाँव में रहने वाला, किसी छोटे स्कूल/कॉलेज में पढ़ने वाला या पढ़ाई छोड़ चुका, लम्बे पाँवों वाला एक छरहरा इंसान होगा ।

अब उस इंसान को चयन-कर्ता कैसे खोजते हैं, यह उन पर निर्भर है ।

Pick-up Type-I (ST) of muscles constitution athletes for endurance and type-II (FT) for sprints. Scientific training can convert some of the type-I (ST) & type-II (FT) muscle phenotypes in to each other through aerobic / anaerobic sets of trainings respectively.

In general comparatively lower aged athletes of 5'7" Ht, 56.2 Kg Wt and 19.42 BMI have statistically shown better performance. Functions of Height must be further subdivided into leg length, arm length & trunk length. In fact not only height and lengths but some other anthropometric parameters as given in table-5 (esp those in red being most crucial) are extremely useful as selection criteria for enhanced performance. Every extra-inch of longer leg lengths will add-up to the Step-length in the in track events and every degree of knee-hip extension will add-up to extra-height

gained in jumps. Similarly every inch of additional or longer arm-lengths in throw sports (in javelin/shot-put/ discus/ hammer) adds-up to the angular/linear speed at release (ωr) is directly proportional to the arm lengths. Hence, anthropometric importance in selection are of immense value to greater performance. Greater arm length & Palm (& foot) area serve as better oar/row of the swimmer. Among the anthropometric parameters, weight-lifting is the sole sport in which lesser height/arm/trunk lengths are important negative factors.

Moderate body frames may allow runners to generate lesser lactate, dissipate body heat more effectively thus giving an advantage to maintain the incredible work output required in the marathoners and other endurance sports.

Performance at state & national levels should form the basis for selection of the Olympic probable.

A previous Olympics medal winner, may be included in the list of probable without screening but they must undergo selections at the national games to ensure their performance are intact. Selection of probable for Physical sports may be “*challenged*” by any individual demonstrating higher performance at any stage till final selection before the event. Such individual performance will become even better with some fine-tuning of the physique & skills in the remaining months of training.

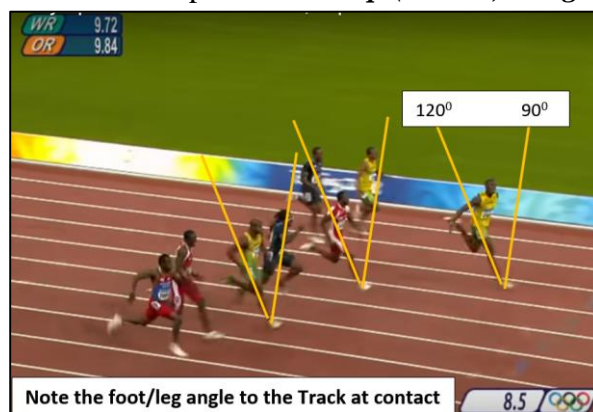
The current selection guidelines by Govt:-

The team in any international event will be represented only by the sports persons having a specified standard, the coaches and the supporting staff (doctors, physiotherapists, psychologists, masseurs etc.) as approved by the ministry will be part of the team. The Standard of individual participants in last 12 months will at least be equal to or better than the 6th rank holder in its previous edition. In the team event, one must have qualified at 8th or higher in its previous edition.

The athletics Trainings for Track & Fields

Training. Unlike domestic sports where training often involves ab-initio athletes, training for Olympics is far too complex, to augment the athlete’s performance to one’s optimum or to the highest. It is a joint task of various groups of the support staff. The *nutritionists* ensure optimum nutrients & calories, at times different for different sports, details of which are already available with SAI. The *highly trained coaches* draw schedules to augment one’s Physical and technical skill capabilities to optimum, right from warm-up to the actual events taking scientific route. Responsibility also lay with him to educate the athletes to prevent any injury during training. *The scientists* ensure that the training needs meet the physical/physiological criteria of one’s aerobic / anaerobic functions thru’ VO_{2max} or other biochemical markers. The *sports psychologists* take the athletes to a specific frame of mind to overcome any doubt on to oneself (also called *killer instinct* in loose terms). It is relevant to all sports where offensive actions by the athletes help them to prevail upon the opponents. This psyche helps in evolving the training pattern. For example, smash action in badminton, penetrating D for a scoring shot in hockey, looking for all opportunities to land a scoring punch in boxing or similar actions in wrestling and other sports become very helpful. Last but not the least, India having vast knowledge of *Yoga*, can assist the athletes in all aspects of promotive, preventive and curative techniques. Last but not the least, entire *sports administration* ensures that effective and structured trainings continue without any hurdles and are so scheduled that the performance of the athletes peak during the actual events, not before or after.

In running/walking sports, distance covered in a unit time is the product of **Step (Stridal) Length (SL) \times Step (Stridal) Frequency (SF)**. SL depends on one's Physique (leg length & strides) and the SF is the function of the muscles & training. Trainers recommend Strides must be optimised with every forward step touching ground at $>90^\circ$ but less than 110° to the track but most of the Olympic 100m finalists invariably show their strides increased to around $110-120^\circ$ deg of contact esp while accelerating.



Strides more than this will lead to “Heel hitting” and slow the SF hence, the time. Every inch of SL add-up to the distance covered. SF on the other hand, is the outcome of number of steps taken in unit time which is the function of the muscle strength & speed. The speed of muscle training responds more to higher Repetitive Movements (RM) than higher loads on the muscles. This is the reason why putting increasingly higher loads on the trails of a sprint runner does not necessarily increase one's speed. Competitive abilities in running, walking, swimming and the other so-called "physical sports" essentially comes owing to the raw muscle strength and speed / endurance (depending on the sports whether it is the speed type or the endurance).

Here comes the Training and Preparations. It all depends upon which championship one is preparing for. In the Indian national games, one of our own athlete will win with whatever time he has. However, in international championship, it gets tough with even fraction of a second counting for podium finish. It gets tougher from national championship to Commonwealth Games (CWG) and finally to the world championship or the Olympics as can be seen in this table-7. It is however, evident that there are very little difference between world & Olympics records. In World & Olympics records, the athlete has to put everything at stake and such performances can only be termed as extreme, the competitive best of the human performance. In order to achieve such best, a very different psyche' has to be developed both among the coaches and the athletes...focussed to break even the previous event records to ensure a win.

Events	Indian	CWG	World	Olympic
<u>100 m</u>	10.26	9.88	9.58	9.63
<u>200 m</u>	20.45	19.97	19.19	19.30
<u>400 m</u>	45.40	44.24	43.03	43.03
<u>800 m</u>	1:45.77	1:43.22	1:40.91	1:40.91
<u>1500 m</u>	3:38.00	3:32.16	3:32.16	3:32.07
<u>5000 m</u>	13:29.70	12:56.41	12:37.35	12:57.82
<u>10000 m</u>	28:02.89	27:19.62	26:17.53	27:01.17
<u>Marathon</u>	2:12.00	2:09:12	2:01:39	2:06:32
<u>110 m hurdles</u>	13.59	13.08	12.80	12.91
<u>400 m hurdles</u>	49.51	48.05	46.78	46.78
<u>3000m steeplechase</u>	8:30.88	8:10.08	7:53.63	8:03.28

Some Training Tips for Sprints

Training approach to the scientifically selected **“Track & Field” sprinters** have to be fully structured. First find out one's SL & SF properly during a video & foot-mark assisted sprint. Measure the SL, the angle of foot-holds on to the ground and finally the SF. At this juncture, another variable called “Flight Time” comes which is the period when both legs are off-ground, a function of the SF propelling power optimally found among elite sprinters. Let us consider each of these one by one:-

Step Length (SL) is a function of the leg length (not one's height alone) and the extent of thigh-hip movements. Hip extension permits the legs move fore and aft during a stride. Here an unrestricted dorsiflexion of the foot become important in permitting the leg extend backward without loosing the foot-power to propel one forward. The stride forward must be only to an extent that permits the ankles perform ball-of-foot movement that does not lead to heel hitting the ground and also pushing back one's Centre of Gravity (CoG) and thus resulting in decelerating or falling back. Strides moving back through hip extension will increase the SL but beyond certain limits, the power of stridal push forward will deplete and so will the flight time. A very fine balance is maintained among the three by the highly successful sprinters and it has to be practiced during training. The trainer must also keep in mind that the stridal length may not be identical for both legs. One should start the spring with a few initial sub-optimal SL (to prevent groin muscle strains/injuries) and then accelerates to optimal, one's maximal. It is natural that SF is inversely proportional with the SL. The highly successful sprinters maintain a reserve in their SF to break-away from the others in the terminal phase of the sprint for a podium finish.

Step Frequency (SF) is a function of the muscles of hip, thigh, calf and a bit of the joints involved. These muscles must be predominantly Fast-Twitch (FT) type as elaborated earlier for a greater SF. However, there are vast influence of different groups of the muscles of hip, knee, ankle and foot in the different stages of the spring incl start, toe-off, flight time, ground touch, Ball-of-foot action to mid stride and again toe-off. Whereas the hip muscles directly influence the SF, the calf & foot muscles dictate the force of flight hence the flight time esp the horizontal component. The groin / hip muscles are esp prone to strain/tear injuries in longer SLs esp in the initial parts of the sprints. As already emphasised that some amount conditioning ST muscles to FT can be undertaken during the training, it must be a gradually increasing range of movements through repetitive process. The trainer & coaches must aim to achieve higher SF by the followings:-

- i. Strengthening the group of muscles for both speed & force.
- ii. Transforming / reconditioning the ST muscles to FT

A gradually increasing **Flight Time / Ground contact time ratio** is a healthy indicator of the progressive training outcome of faster sprints. Stride Flight achieved from higher dorsiflexed foot yields greater Stride Length with just minimal vertical rise.

Throw & jumps sports where a 'one-time action' of a group of muscles win the medals, power & speed training of such muscles are of immense value. In throw-sports, preponderance of the arm, shoulder, trunk & waist muscles are coordinated so as to have maximum effects. It is important to release the **javelin/discus/shot-put/hammer** skilfully at a time when the combined linear/angular speed of body-arm is maximum. We often see an athlete running 40-50 kmph but slowing down to 20 kmph at the time of javelin release. Similarly, body-rotation and the extent of arm-length are directly proportional to the distance a shot-put/discus/hammer will travel when released at optimum angles. In shot-put & javelin throws, the whiplash action of the hip-trunk-shoulder as a unit also comes in play. The bottom-line in the above statements are the advantages of the body-limb lengths as well as muscle strength & speed.

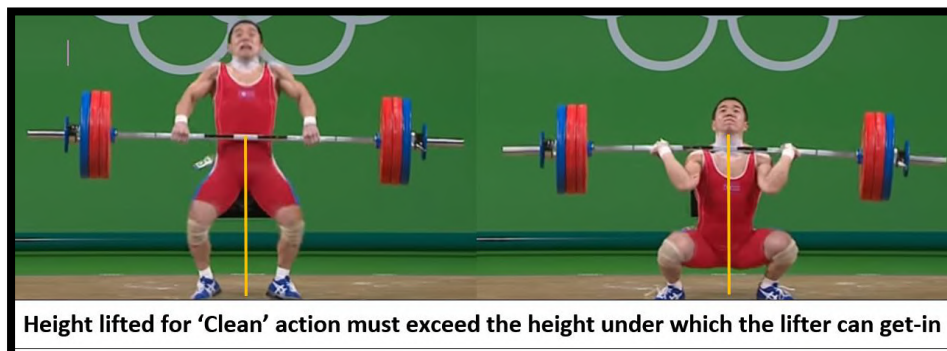
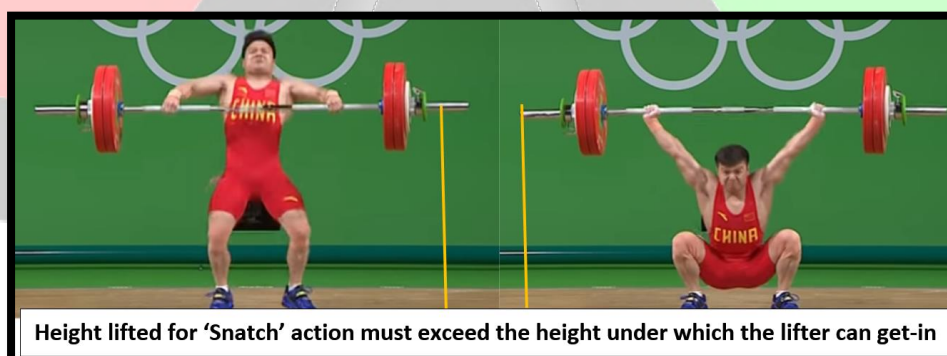
Some training tips in Weight-Lifting

Having background of *Weight-lifting* I know it looks a one-time action but actually it involves almost all muscles of the body. The ‘Clean’ action involves extension of knees, hip, ankles, flexion of elbows, extension & abduction of shoulder joint and finally extension of the trunk. ‘Jerk’ involves all movements of a static jump, extension & abduction of shoulder, extension of elbows keeping spine straight. Thus calf, thigh, hip, arms, shoulder and spinal muscles are involved and all *these need training for both strength & speed* involved in initial “clean or snatch” followed by power lifting from squat position.

Increasing the power of the muscles have to be through a structured weight training with the Squat, dead-lift, bench-press, shoulder-press and ‘pull-up above waist’ with gradually increasing weights....being the most crucial. For the strength training, coaches will surely formulate the best sequence of exercises and its RMs with due attention to the diet and neuromuscular impulse training too. *Increasing the Speed muscles* are structured training of conversion of some of the ST muscles in to FT.

The Indian weight-lifting team’s performance in its current form as shown in table-4 above, is nowhere close to even qualifying for the Olympics, leave alone the medal hopes. The training skills of coaches are not updated the age-old methods have given no space to the technological approaches.

Getting underneath the weight-bar after “clean or snatch” is an art in its skill training. It may be useful to practice the “clean” & “snatch” actions to the max weight initially without actually getting underneath the weight bar, without fear of getting wrist/elbow/shoulder/spine/back injuries that is so often encountered while getting under the bar. It must be understood here that Weightlifting is the most vulnerable non-contact sports inflicting injuries to the extent that the sportsperson may be



out of the game for life. Hence, to ward off the chances of injuries, the heavy weight training could be done with safety and free of fear for injuries. This could easily be done on a specially designed weight suspending vertical bars having multiple notches at every 1 cm or so allowing only one-way upward movement that gets locked immediately the weight bar starts coming down after the complete 'snatch or clean' action. Such facility will allow a weight lifter to a fearless, gradually increasing the weight through these actions. The height lifted so, is noted. These heights must exceed the minimum weight-bar height under which the lifter can get in, from where one will be able to get-up with those given weights. This training must be continued till the "clean or snatch" actions of the lifters lift the desired weight to the required height to a stable squat position and be able to rise-up to lift the weights. Of course, the coach must ensure that the 'snatch or clean' action combines all actions optimally...ie



fully extending the knees, hips and the ankles while the upper torso muscles pull the weight-bar to the maximum possible height. A similar platform of vertical bars can be made to practice getting-up from the squat position after the end of the "clean or snatch" actions with the gradually increasing weights. These vertical bars could also be useful for the "Jerk" action after the 'clean' to increase his lifting power without injury concerns.

The above actions must also be practiced without vertical bars in order to balance one-self while trying to get under the weight bar, trying to get-up with the weights from the squat position or balancing after the important 'jerk' action. This does not rule out the fact that the art & skills of the lifter getting underneath the bar during clean or snatch are equally important. Training must also address a correct technique in the various stages of the weight-lifting. Despite all these the strength training does take times in months if not years. Accordingly, the performance output also takes time and there is no quick-fix measure in Olympic medallion prospects.

Injury Concerns in Sports

The injury concerns in the sports are basically of two types namely those owing to incorrect training methods and those due to attempts on higher performance usually in the competitions. The former injuries are almost 100% preventable if coaches are qualified and strict about the warm-up schedules, a structured progression in performance parameters and keeping a hook on an odd careless person during training. On the other hand, the injuries during championships are commonly encountered in pursuit of higher performance. Such injuries are encountered in almost all events but the contact games and weight-lifting are especially vulnerable as shown in the table opposite. Contact games have typical injuries of contact areas and due to the impacts of fall, boxing is infamous for various types of direct punch-injuries over body and the concussion of the brain, weight-lifting has chances of back, shoulder, arms, thigh and knee injuries.

Major Incidence of Injuries in 2008 Olympics (n= 9672; Injured-1055)

Football (31.5%)
Taekwondo (27.0%)
Hockey (20.4%)
Handball (17.4%)
Weightlifting (16.9%)
Boxing (14.9%)
Other Injuries...
Sprints & runs (~5%)
Jumps (~3%)
Throw sports (~3%)

Training Progress. During the training, one's progress must be observed scientifically through evaluation of VO_{2max} , maximal cardiac output, speed/power output, the lactate threshold. Isometric

/ Isotonic *Dynamometer* and *goniometer* should be used in measuring the force & movement of the limbs / trunk. It is equally important to prevent injuries during training which mostly take place due to inadequate warm-up, improper technique and excessive loads.

Some other measures in training

World Class Athletes are very special. They belong to an elite class yet they possess some qualities which are very personal and any successful coach must know it. Only after they are acquainted with it, they will be able to get the best out of an athlete. Athletes being a human being, do tend to get affected with their biorhythms among other psychosocial factors on which they may not have a direct control. Successful coaches and team-psychologists are mostly conversant with all these and also possess skills to largely get the athletes out of such blues. They also enthuse the athletes during the championships when the countrymen pray for them to succeed. As such representing the country in those events boosts the morale of the athletes when they put all their skills at the stake to fulfil the national aspirations. Yet, there are numerous instances when an athlete has failed to bring-out even his own best in the championships. Some examples of 2016 Rio-Olympics when some of our prominent athletes were unable to repeat their own performances, are mentioned here. Although it couldn't have been deliberate, the athletes, coaches and the supporting staff are expected to bring out better than their bests on the D-Days....with plenty of enthusiasm, high morale and the quest to make the country proud. Thus if some one at the Olympics / World Championship fails to perform better than own best, it must be considered a collective failure on part of all concerned.

BELOW THEIR BEST	
For many athletes Olympics are the platform to outperform, not so for Indians	
 Dutee Chand (100m) Rio: 11.69s ; best: 11.24s	
 Muhammad Anas (400m) Rio: 45.95s ; best: 45.40s	
 Ankit Sharma (long jump) Rio: 7.67m ; best: 8.19m	
 Tintu Luka (800m) Rio: 2:00.58 min ; best: 1:59.17 min	
 Lalita Babar (3000m steeplechase) Rio: 9:22.74 min ; best: 9:19.76 min	
 Vikas Gowda (discus) Rio: 58.99m ; best: 66.28m	
 Seema Antil (discus) Rio: 57.58m ; best: 62.62m	
 Manpreet Kaur (shot put) Rio: 17.06m ; best: 17.96m	
 Gagan Narang (shooting) Fails to qualify for 10m rifle finals; best: Bronze at London 2012	
 Sajan Prakash (200m butterfly) Rio: 1:59.37 ; best: 1:59:27	

Yoga in Sports Training is very important to have physical & mental conditioning to excel in any sports. Yoga-asanas assist in the body flexibilities (required in most sports) and muscle relaxations as well as in quickening of neuro-muscular action timings. Deep breathing exercises gradually increase the vital capacities of the lungs. As a result more Oxygen molecules are available for the blood to be grabbed in lungs and make it available to the sprinting muscles. It also augments oxygenation. Meditation is of immense value in increasing the concentration, focus on to the goal and overcoming any negative thought therein. Yoga too is already introduced in varying forms at the training centres though there are scope for better approach.

The Threat of Covid19 Pandemic

The world is under the grip of Wuhan Virus causing the worst ever pandemic. Those who suffered from the infection, have been trying to gain the losses their physical functions which is extremely challenging. Even those athletes who were unable to train optimally under the lockdown and other constraints of training, are finding it difficult to regain full physical functions.

Corona virus when get in to the body cells and tissues, become parasites on them for oxygen. Hence, any intense physical sport with very high oxygen demand, be that sprint or endurance, make the sportsmen vulnerable to both loss of functions as well as risk of Hypoxia and to lives. People

have collapsed or had heart attacks during intense physical activities during these times. Hence, all attempts should be made to doubly testing all such athletes for Covid19 before they participate in the sports of intense physical exertions. It is for their own good.

There is also a concern of contacting the infection esp in the 'contact sports' from opponents who are either asymptomatic infected who tested 'false negative'. There could be many such cases even after vaccination. If someone gets infected, he or she may infect many others in own team before being detected. This will put the entire team at risk of illness as well as poor level of performance.

Concluding Remarks

Indian aspirations of medals at the Olympics or World events have been alluding us since inception of such events. Except for an odd sports events, our selection & training methodologies have been inadequate. Various studies have brought out the problem areas and of late, govt has been trying to address most such issues too. Sports institutions of excellence have been open. The investments in sports have been hiked steeply. It can only hoped that such steep hikes are for right reasons and reaching the right cause. The most important is sports federations & SAIs updating knowledge in sports science & technologies, engaging the qualified coaches...those who have actually tasted the podium finish in world/Olympics championship or someone who has taken the trainees to the podium finish. Only such coaches can be expected to fulfill our ambitions of Olympic medallions. This article has also tried to look specially into the scientific basis of selection and training and brought out the intricacies involved in various sports. There are differing physical & skill levels required in different sports and the physical aspects of the athletes have been highlighted in this article. There are two different body constitution (phenotypes) suitable for differing sprint and endurance sports for which training methodologies differ.

This article dwells at some length the specific training methods in "Track & Field" events as well as the weight-lifting where medal aspirations have been alluding India. It must be remembered that competing for World or Olympics events calls for total dedication on the part of the entire machineries incl the athletes, the coaches as well as the supporting staffs. It is for the supervisory staff to assess the level of the preparations for Tokyo 2020 or any other future championships. However, the present performance level of our athletes at various national & international meets incl world athletics 2019 are not very encouraging, they fall far short of Olympic medal aspirations.

"आर्यावर्त में खेलों का प्रादुर्भाव"

भारतीय दार्शनिक तो जीवन को ही खेल मानते हैं और किंवदंति है कि ईश्वर ने खेल-खेल में ही सारी सृष्टि की रचना कर दी। शायद यही कारण है कि आदिकाल से आज तक सभ्य-असभ्य सभी जातियों एवं देशों में खेल महत्वपूर्ण है। ऋग्वेद में जुए के खेल की चर्चा, जुआरी का पत्नी को दांव पर लगाया जाना, पासों की मोहक शक्ति का बहुत ही विखित एवं हृदयस्पर्शी वर्णन हुआ है। ऐसा ही वर्णन महाभारत काल में धृतराष्ट्र की सभा में चौसर खेल, द्यूतक्रीड़ा, पाण्डु राजा युधिष्ठिर द्वारा द्रौपदी को दांव लगाए जाने की भी चर्चा है।

समय का लेखा-जोखा करते हुए ये बताना कठिन है कि किस खेल का प्रावधान कब से आरम्भ हुआ परन्तु विभिन्न वेदों, पुराणों, रामायण, महाभारत, हड़डपा-मोहनजोदड़ो की सभ्यताओं, उत्तर पूर्वी भारत के तथा दक्षिणोत्तर राज्यों की जिसमें श्रीलंका भी शामिल है के इतिहास पर दृष्टिपात करने से ज्ञात होता है कि अनेकानेक आधुनिक खेलों का प्रादुर्भाव आर्यावर्त में ही हुआ है।

पुरातन काल में निम्नलिखित खेलों के नाम कुछ इस प्रकार से थे जो समयांतराल में क्रमशः धीरे-धीरे आधुनिक नाम से जाने जा रहे हैं। आधुनिक खो-खो, कबड्डी, वस्तुतः युद्धकला की व्यूह रचना का पर्याय है, जिसमें प्रवेश कर निकलना किसी के लिए आसान नहीं होता है। आधुनिक कुरती-मल्लयुद्ध-भारतीय पौराणिक चरित्र बलराम, भीम, हनुमान, जामवन्त आदि मल्लयुद्ध (आधुनिक कुरती) में प्रख्यात थे। गेंदाबाजी की चर्चा श्रीकृष्ण के बचपन की कथा में आती है। कंदुक क्रीड़ा (बॉल)के नाम से जाना जाता था। बॉल जब यमुना नदी में गिर जाती है तो श्रीकृष्ण उसे लेने के लिए जमुना में छलांग लगा देते हैं, इसमें कालिया नाग-मर्दन कथा का भी वर्णन है।

ऊँची छलांग, लम्बी छलांग, हाथों के ऊपर उल्टा चलना, बाँस के सहारे ऊँची दीवारों को फाँद जाना या रस्सी पर बाँस सहारे चलना आदि खेल वस्तुतः बंजारों के करतब दिखाने से सम्बंधित हैं जिन्हें पौराणिक काल में बिना किसी सुरक्षा कवच के आम लोगों को दिखाया जाता था। आधुनिक चैस, शतरंज, पौराणिक काल में रानी मन्दोदरी के द्वारा आविष्कृत माना जाता है जिसे चतुरंग नाम से जाना जाता था, मन्दोदरी की पुत्रवधू मेघनाद की पत्नी ने भी युद्धभूमि से पति का ध्यान हटाने के लिए इस परंपरा को अपनाया था। इसे अष्टपदा (8×8) भी कहा जाता था।

वस्तुतः युद्धभूमि में ये चतुरंगिणी सेनाएं हाथी, घोड़े, ऊँट, रथी और पैदल सिपाही होते थे जिनका युद्ध कौशल, तत्क्षण निर्णायक शक्ति का विकास इन खेलों से होता था। क्षत्रियों को शारीरिक विकास एवं युद्ध कला में निपुण बनाने के लिए विभिन्न प्रशिक्षणों के पश्चात प्रतियोगिताओं का आयोजन भी होता था। रथ-दौड़, धनुर्विद्या, तलवारबाजी, घुड़सवारी, मल्लयुद्ध, तैराकी, भला-फेंक, आखेट आदि खेलों की चर्चा रामायण एवं महाभारत में पाई जाती है। बाणों पर कितना नियंत्रण रखा जा सकता है इसे एकलव्य की कहानी से जान सकते हैं-जिसमें कुत्ते के भौंकने पर उसका मुँह तीरों से भर कर बन्द कर दिया गया था परन्तु मुख के अन्दर एक खरोंच नहीं आयी थी। विलास-मणि-मंजरी ग्रंथ में भी ऐसे विभिन्न खेलों की चर्चा है। गौतमबुद्ध भी उपर्युक्त वर्णित खेलों की स्पर्धाओं में भाग ले चुके थे।

महाभारत काल में कबड्डी "एक-श्वाश" के नाम से तथा विभिन्न राज्यों में विभिन्न नामों से जाने जाते हैं। महाराष्ट्र के संत तुकाराम ने इसे अपनी साहित्यिक कृतियों में उसे "अभंग" नाम दिया है। आधुनिक "पोलो" मणिपुर राज्य में 3100 ई.पूर्व समोल कांगेजेई के नाम से प्रसिद्ध था। जिम्नास्टिक खेलों के जिस रूपों को आधुनिक काल में देखते हैं उसका प्राचीनतम रूप योगासन, मलखंभ, रज्जु पर लटक कर विभिन्न करतब दिखाने से सम्बंधित है।

वल्लमकली नौका दौड़ केरल के प्रसिद्ध पार्थसारथी मंदिर के धार्मिक अनुष्ठानों से जुड़ा पौराणिक खेल है।

लूडो की चर्चा महाभारत काल में चौपड़ के नाम से वर्णित है, इसे सत्यभामा श्रीकृष्ण के साथ खेलती थी। समयांतराल में इसे पच्चीसी के नाम से भी जाना जाता था और इसके कई रूप थे, बाद में अंग्रेजों ने इसे लूडो का नाम दिया, जो आज भी प्रचलित है।

स्नेक एंड लैडर भी वस्तुतः मोक्ष-पट' या "कैलास-पटम" "परमपद' के नाम से जाना जाता था, यह खेल-खेल में बच्चों में धार्मिक कृत्य की प्रवृत्तियों को विकसित करती थी। अच्छे कर्म उसे स्वर्गिक सुख एवं मोक्षदायिनी सीढ़ियों पर ऊपर बढ़ाती थी वहीं कुकृत्य, हिंसा आदि उसे पतन के रास्ते (साँप) नीचे नर्क में पहुँचाती थी। जैन एवं बौद्ध धर्मों में भी साँप-सीढ़ी खेल को लेकर लगभग यही मान्यताएँ हैं। इस खेल से बाद में धार्मिक मान्यताओं को हटा दिया गया एवं यह खेल मात्रा खेल तक ही तक सीमित रह गया।

गाँवों में अभी भी गिल्ली-डंडा, काँचे-कंचे, राजा-कबड्डी, धुआ-कबड्डी, बैल-गाड़ियों की दौड़, ऊँटों की दौड़, रस्सी-कूदना, कुरती, तैराकी (नदियों में), कित-कित-था, पकड़म-पकड़ाई, लँगड़ी-टाँग, "घोघो रानी कितना पानी" आदि अभी भी प्रचलित हैं। लाठी-भाँजना, तैराकी नदी-किनारे के गाँवों के लिए सिर्फ खेल नहीं बल्कि आवश्यकताओं से जुड़ी हुई है।

इस तरह हम पाते हैं कि बहुत से खेल ऐसे हैं जो पुरातन-काल से आर्यावर्त में अन्यान्य नामों से प्रचलित रहे हैं।