

# Hammer Throwing



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Bondarchuk, myself, Don Hansen and Sedykh at  
“Hansen’s Jewellery” Canberra 1991

1<sup>st</sup> Edition May 1987 the original paper towards my level 3 Hammer coaching qualifications.

2<sup>nd</sup> Edition Jan 2007 updated to include women, the Weight, and another 20 years experience.

## **THE AUTHOR**

I thought I should say something about myself here. Not everyone has heard of Bob Wagner, well not in a good way, usually confused with Robert Wagner the movie star and more recently in Australia Robert Wagner the serial killer.

I developed my love of athletics in High School first of all at Woodburn Central School in Northern NSW (Australia) then at nearby Ballina High School. Ballina was well known as an athletic school. I developed into a bit of an all rounder under the guidance of PE teacher John Savage.

In my final year of school I was selected to represent both QLD and NSW at the Australian All Schools Championships, I represented NSW as their team also toured New Zealand. I competed for NSW in Long Jump, Triple Jump High Jump and Discus.

During my University years I competed mainly in the Decathlon winning the Australian Intervarsity decathlon in 1976 (5700+ points) along with the pole vault ( the good vaulters no heighted). I carried on doing this into my early years of teaching until a pole vault injury stopped me from jumping. I started attending the Sydney Throwers Club on a more regular basis and started throwing the hammer at age 26. I instantly knew this was the event for me. I worked from that point on with Ian Ison. Ian and his family adopted me into their family over the

next few years. I threw with 4 turns until the end of 1986 and went to 3 turns from then on. I always had a problem with my entry, and lots of people had ideas on how to fix it, however it wasn't until I spent a week training with Sedykh and Bondarchuk in Canberra that the problem was fixed. Bondarchuk fixed my entry in 2 days. Occasionally I throw poorly caused by one of two problems. I was reasonably strong having lifts of 270/150/260 in a Power lifting competition and 135/117.5 in an Olympic lifting competition. I could usually squat around 240 with no knee wraps or belt. My best power snatch was 120X2 from the hang, and power clean 165. Over head shot PB was 19.38m.

My hammer progression was as follows:

1983 47.38  
1984 56.46  
1985 59.46  
1986 68.06  
1987 68.60  
1988 67.50  
1989 62.96 (glandular fever)  
1990 69.50, 70.18 (un-surveyed field)  
1991 68.38

I retired in 1992 having injured myself tossing cabers at Highland Games.

In 2003 I joined Masters as a 47yr old. Currently I have thrown Mens 45-49yrs Hammer 51.95m and Weight 16.11m. Oh, and that is me on the front cover for a Nikon camera add in 1987.

## INTRODUCTION

The hammer throw has its origins with the Scots and the Irish, who used to throw a blacksmith's hammer, and later an implement consisting of a ball similar to the present one, but with a wooden handle.

Around the end of the 19th century the hammer handle changed from wood, to chain, and finally to a steel wire with a triangular handle. At the same time the weight, length of the hammer and size of the circle were standardised. The standard hammer is 7.260 kg in weight, 1.215 m long and is thrown from a 2.135 m diameter circle. The womens implement is 4.00 kg and 1.195 m long. Mens and womens wire are the same length.

Around 1900 John J. Flannagan developed the jump turn, and between himself and Pat Ryan raised the world record to 57.77 m in 1913.

During the mid 1930's the Germans developed the heel, ball-of foot turns in which ground contact is kept throughout the throw, enabling Erwin Blask to throw 59.00 m in 1938.

In 1952 Josef Csermak (Hungary) became the first 60 metre thrower with a distance of 60.34 m.

1952 was also the first year that the Soviets entered athletic competition, they had an immediate influence on the hammer event. Mikhail Krivonosov showed the athletics world a lean-away, and progressively increasing lead on the hammer from start to delivery. He carried the world record to 67.32 m in 1956.

Hal Connolly, from the USA and Gyula Zsivotzky from Hungary held the Soviets at bay for some time. Connolly emphasised the importance of correct swings and keeping a dragging lead on the hammer head throughout the turns. He became the first 70 metre man in 1960 with 70.33 m.

Romuald Klim (74.52 m) was the first of an onslaught of Soviet throwers. He was succeeded by Anatoli Bondarchuk. Bondarchuk increased the world record twice in 1969, to 74.42 m and 75.48 m. Later he threw 77.42 m, but his contribution to throwing has come mainly through his coaching, as the Soviet National Coach.

Bondarchuk lead the Soviet in a rethink of the hammer event. The Soviets emphasise keeping both feet on the ground longer, increasing the radius, and

using the whole right side of the body to push the hammer. As a consequence Boris Zaichuk became the first 80 metre thrower, with 80.14 m in 1978.

The West Germans have also had an influence on the hammer event, lead by Karl-Hans Riehm. The Germans have emphasised speed and strength enabling Riehm to throw 80.34 m in 1978 and hold the world record for almost two years, before returning it to the Soviets with Youri Sedykh's 80.38 m in 1980.

The early throwers used one and later two turns. Today all top throwers use either three or four turns. Four turns being introduced by Stanislav Nyenashev in the 1950's. In 1954 he threw a world record of 64.05m.

Womens hammer throwing was not ratified until 1995. However it had been a recognised event in several countries prior to its ratification. I remember see Cheryn Ison throw over 42 m in NSW in the early 1980's and Bernadete Serone training as a school girl throwing around 45 m in Sydney (Australia). It was included in the Olympics for the first time in 2000. The standard has grown rapidly past the 70 metre mark. The current world record set by Tatyana Lysenko (RUS) is 77.80 m.

The men's world record stands at 86.74 metres set by Youri Sedykh in 1986, one of Bondarchuk's pupils. It appeared that this men's record would be untouchable however in 2005 Ivan Tikhon (BLR) threw 86.73 m.

The number of 80m throwers continues to increase, with women also closing in on this distance.



Tatyana Lysenko 2006

## WORLD RECORD PROGRESSION

### Men

57.77	Patrick Ryan	USA	1913
59.00	Erwin Blask	Germany	1938
59.02	Imre Nemeth	Hungary	1948
59.57	Imre Nemeth	Hungary	1949
59.88	Imre Nemeth	Hungary	1950
60.34	Josef Csermak	Hungary	1952
61.25	Sverre Strandii	Norway	1952
62.36	Sverre Strandii	Norway	1953
63.34	Mikhail Krivonosov	USSR	1954
64.05	Stanislav Nyenashev	USSR	1954
64.33	Mikhail Krivonosov	USSR	1955
64.52	Mikhail Krivonosov	USSR	1955
65.85	Mikhail Krivonosov	USSR	1956
66.38	Mikhail Krivonosov	USSR	1956
67.32	Mikhail Krivonosov	USSR	1956
68.54	Harold Connolly	USA	1956
68.68	Harold Connolly	USA	1958
70.33	Harold Connolly	USA	1960
70.67	Harold Connolly	USA	1962
71.06	Harold Connolly	USA	1965
71.26	Harold Connolly	USA	1965
73.74	Gyula Zsivotzky	Hungary	1965
73.76	Gyula Zsivotzky	Hungary	1968
74.52	Romuald Klim	USSR	1969
74.68	Anatoli Bondarchuk	USSR	1969
75.48	Anatoli Bondarchuk	USSR	1969
76.40	Walter Schmidt	FGR	1971
76.60	Reinhard Theimer	FGR	1974
76.66	Aleksey Spiridonov	USSR	1974
76.70	Karl-Hans Riehm	FGR	1975
77.56	Karl-Hans Riehm	FGR	1975
78.50	Karl-Hans Riehm	FGR	1975
79.30	Walter Schmidt	FGR	1975
80.14	Boris Zaichuck	USSR	1978
80.34	Karl-Hans Riehm	FGR	1978
80.38	Youri Sedykh	USSR	1980
80.46	Yuri Tamm	USSR	1980
80.64	Youri Sedykh	USSR	1980
81.66	Sergei Litvinov	USSR	1980
81.80	Youri Sedykh	USSR	1980
83.98	Sergei Litvinov	USSR	1982
84.14	Segei Litvinov	USSR	1983
86.34	Youri Sedykh	USSR	1984
86.66	Youri Sedkyh	USSR	1986
86.74	Youri Sedykh	USSR	1986

### Women

17.03	Lucinda Moles	ESP	1931
18.58	Aurora Villa	ESP	1931
22.85	Margareta Moles	ESP	1932
32.08	Rosemary Payne	GBR	1975
32.94	Liselotte Hansen	DEN	1980
33.12	Sandra Stepp	USA	1981
36.72	Liselotte Hansen	DEN	1981
38.33	Debbie Lombard	USA	1982
41.99	Carol Cady	USA	1982
48.13	Carol Cady	USA	1982
53.65	Carol Cady	USA	1982
54.86	Carol Cady	USA	1982
57.51	Carol Cady	USA	1982
58.26	Lyubov Vasilyeva	URS	1988
58.52	Carol Cady	USA	1982
58.94	Carol Cady	USA	1982
58.98	Lyubov Vasilyeva	URS	1988
61.20	Aja Suzuki	JPN	1998
61.50	Yelena Pichugina	URS	1989
61.96	Larisa Baranova	URS	1990
62.70	Alla Fyodorova	URS	1991
63.08	Larisa Shtyrogrizhnaya	URS	1991
64.44	Alla Fyodorova	URS	1991
64.44	Olga Kuzenkova	RUS	1992
65.40	Olga Kuzenkova	RUS	1992
66.84	Olga Kuzenkova	RUS	1994
67.34	Svetlana Sudak	BLR	1994
68.14	Olga Kuzenkova	RUS	1995
68.16	Olga Kuzenkova	RUS	1995
69.46	Olga Kuzenkova	RUS	1996
69.58	Michaela Melinte	ROM	1997
70.78	Olga Kuzenkova	RUS	1997
73.10	Olga Kuzenkova	RUS	1997
73.80	Olga Kuzenkova	RUS	1998
75.29	Michaela Melinte	ROM	1999
75.97	Michaela Melinte	ROM	1999
76.05	Michaela Melinte	ROM	1999
76.07	Michaela Melinte	ROM	1999
77.06	Tatyana Lysenko	RUS	2005
77.26	Gulfiya Khanafeyeva	RUS	2006
77.41	Tatyana Lysenko	RUS	2006
77.80	Tatyana Lysenko	RUS	2006

## WEIGHT THROWING

The weight throw is very similar to the hammer throw and is thrown by Masters athletes and indoors in the USA. The Weight comes to us from the USA and is 15.88kg (35lb) in weight and is 43cm (17 inches) in overall length for men and is 9.90kg (20lb) for women. Other weights are thrown depending on age and sex, as listed below. The weight throw is a good strengthening exercise for the hammer throw. Most throwers throw the weight with only one swing followed by a number of turns. That number is anywhere from 1 through to 4 turns depending on the number of turns the thrower normally does when throwing the hammer. A variation on the swing is called the sling. This is where the weight is swung like a pendulum start and not swung around the head at all.

AGE	< 50	50-59	60-69	70-79	80+
MEN kg	15.88	11.34	9.072	7.258	5.449
WOMEN kg	9.90	7.260	5.449	5.449	4.00

### AUSTRALIAN RECORDS @ 1<sup>th</sup> Dec 2006

#### MEN

##### 15.88kg

M30	David Allen	Qld	17.05	2005
M35	Russell Devine	VIC	17.76	2004
M40	Hanz Lotz	VIC	16.60	1992
M45	Bob Wagner	QLD	16.11	2004

##### 11.34kg

M50	Bob Wagner	QLD	19.77	2006
M55	Grame Rose	VIC	17.84	1999

##### 9.072kg

M60	Grame Rose	VIC	19.03	2006
M65	Wim Van Weeneen	VIC	18.57	1997

##### 7.258kg

M70	Wim Van Weeneen	VIC	17.96	2002
M75	Roy Foley	VIC	14.81	1992

##### 5.449kg

M80	John Fraser	VIC	15.10	1995
M85	John Fraser	VIC	12.99	2000
M90	John Fraser	VIC	10.11	2005

#### WOMEN

##### 9.072kg

W30	Tracey Brown	WA	12.18	2004
W35	Jayne Hardy	ACT	14.46	2002
W40	Jayne Hardy	ACT	14.62	2003
W45	Chris Schultz	VIC	13.57	1997

##### 7.258kg

W50	Marja-Lenna Parviainen	NSW	16.54	1997
W55	Marja-Lenna Parviainen	NSW	15.15	2002

##### 5.449kg

W60	Helen Searle	NSW	17.52	2000
W65	Helen Searle	QLD	16.44	2005
W70	Val Worrell	VIC	10.94	2005
W75	Gwen Davidson	VIC	10.30	1998
W80	Gwen Davidson	VIC	8.80	2003
W85	Ruth Frith	NSW	7.78	1995
W90	Ruth Frith	NSW	6.19	2001

##### 4.00kg

W95	Ruth Frith	NSW	6.23	2005
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### Men Weight Throw Age Best on Record

##### 15.88kg

<http://www.geocities.com/Colosseum/8682/age.htm>

19.52 @ 17 Josh McCaughey(US,26Sep82) 22Jan00 Cambridge  
 20.72 @ 18 James Steacy (Can,29May84) 28Feb03 Windsor  
 22.02 @ 19 James Steacy (Can,29May84) 8Feb04 Saskatoon  
 22.43 @ 20 Robert Weir (GB,4Feb61) Mar81 Detroit NCAA  
 24.01 @ 21 Dan Taylor (US,12May82) 21Feb04 Columbus  
 24.72 @ 23 Scott Russell(Can,16Jan79) 8Feb02 Ames IA  
 25.03 @ 25 Libor Charfreitag (SMU,Svk,11Sep77) 03  
 25.86 @ 33 Lance Deal (NYAC,21Aug61) 4Mar95 Atlanta  
 25.48 @ 34 Lance Deal (NYAC,21Aug61) 2Mar96 Atlanta  
 25.17o@ 35 Yuri Tamm (Est,5Feb57) ?Mar92 Yokohama?  
 24.21 @ 36 Lance Deal(NYAC,21Aug61) 28Feb98 Atlanta  
 24.11 @ 38 Lance Deal (US,21Aug61) 19Feb00 Bozeman  
 22.53 @ 39 Jud Logan (US,19Jul59) 12Dec98 Kent  
 22.52 @ 43 Ed Burke (US,4Mar40) 14Jan84  
 19.58 @ 45 Harold Connolly (US,1Aug31) 8Jan77  
 19.54 @ 51 Bob Backus (US, ) 24Feb78  
 15.76 @ 56 Tom Gage (US,16May43) 25Mar00  
 14.05 @ 57 Richard Hotchkiss (US, ) 18Feb96

### Women Weight Throw 9.072kg

11.30 @ 14 Maureen Griffin (US,6Oct80) 14Jan95  
 15.76 @ 15 Maureen Griffin (US,6Oct80) 13Jan96 Rigby  
 18.55 @ 16 Maureen Griffin (US,6Oct80) 08Mar97 Boston  
 19.32 @ 18 Amarachi Ukabam (US,14Mar84) 22Feb03 Columbus  
 21.58 @ 19 Jenny Dahlgren (Arg,27Aug84) 13Feb04 Blacksburg  
 21.86 @ 20 Jukina Dickerson (US,7Aug81) 10Feb02 Gainesville  
 23.05 @ 21 Candice Scott (Tri,17Sep80) 8Mar02 Fayetteville  
 23.95 @ 23 Erin Gilreath (US,11Aug80) 25Jan04 Gainesville  
 23.60 @ 25 Dawn Ellerbe (US,3Apr74) 4Mar00 Atlanta  
 23.56 @ 27 Anna Norgren-Mahon (US,19Dec74) 1Feb02 Manhattan  
 23.12 @ 29 Anna Norgren-Mahon (US,19Dec74) 18Jan04 Allston  
 19.84 @ 31 Alexandria Earl-Givan (US,25Apr70) 1Feb02 Manhattan  
 19.33 @ 32 Alexandria Earl-Givan (US,25Apr70) 28Feb03 Boston  
 18.55 @ 33 Alexandria Earl-Givan (US,25Apr70) 22Feb04 Allston  
 17.24 @ 43 Oneithea Lewis (US,11Jun60) 30Jan04 Boston  
 13.90o@ 46 Carol Finsrud (US,20Feb57) 6Sep03  
 12.20 @ 45-49 Riita Puikkonen (Fin,?) 02  
 11.70 @ 49 Vanessa Hilliard (FL) 24Mar91  
 11.53 @ 5? Pauline Thomas (US,?) 00  
 11.42 @ 53 Vanessa Hilliard (US) 31Mar95  
 11.21 @ 55 Vanessa Hilliard (US) 21Mar97 Boston

## **A HISTORY OF HAMMER THROWING IN AUSTRALIA**

### **Men**

Australasian Championships were held up until 1927, and National Titles approximately every two years from then until 1936. There was no hammer title contented in 1930 or 1932, and no National Titles during the war years.

The early Australian hammer thrower was usually an all round thrower. Of these W.J.O'Reilly (NSW) stands out, winning both the shot titles from 1901-1909 and the hammer titles from 1901-1905 and again in 1909. He also held the first official Australian record at 43.22 metres in 1914.

The early throwers used two turns, it was not until Myer Rosenblum and Keith Pardon, both from NSW, did three turns become common. Myer won the 1934 and 1936 National Titles, and set a national record of 43.90 m in 1935. He also represented Australia at the 1938 Empire Games, finishing 5th with 41.39 m. He continues to be involved in athletics, through coaching, and at one time was the NSW Hammer Coach.

Keith Pardon won both the discus and hammer titles in 1937 (39.30 m/44.26 m). He also won the discus again in 1947, and later from 1951-1953. His hammer exploits were to win National Titles from 1950-1953 and again in 1955. Winning National Titles over a period of eighteen years. Keith was also an A Grade tennis player in Sydney. His Saturdays would consist of playing tennis, and between sets competing in the discus and hammer events at interclub.

During his time as a thrower Keith raised the Australian record to 49.52 metres in 1952. He also won silver medals in both the 1938 and 1950 Empire Games (45.15 m/47.48 m). During the war years he had a throw of around 50 metres in an exhibition. Keith had his run of National Titles interrupted in 1954 by up and coming fellow New South Welshman Tom Mullins.

Tom Mullins had held National sub-junior, junior and open records in the hammer, before winning the 1954 National Title. He then travelled to the University of Hawaii where he studied from 1954-1964. Tom is one of a number of Australian athletes that have had problems with Australian Selectors. In 1956 he finished in the top six in the USA Olympic Trials, and later had a throw of 62 metres in an exhibition meet. This throw was only two metres short of the then world record. These performances were not recognised by

the Australian Selectors, who believed that he should not have left Australia. Tom had an eight year lay-off and returned to finish second in the 1974 National Championships. He was again overlooked for Australian selection for the Commonwealth Games, and retired from competitive throwing shortly afterwards.

Herby Barker and Charlie Morris continued the NSW tradition of hammer throwing. Both winning National Titles and representing Australia. Herby represented at the 1950 Empire Games and finished 3rd with 45.62 metres.

Charlie Morris not only won two Australian Titles but broke the Australian record twice, raising it to 56.46 m in 1958. He represented Australia at both the 1958 and 1962 Empire Games, and the 1956 Olympic Games in Melbourne.

Dick Leffler took up the hammer in 1957 and became one of many Victorians to dominate the hammer in recent years. At the age of 24, Dick was inspired to become a discus thrower having seen Al Oerter win the discus gold medal at the 1956 Olympics in Melbourne. Coach Franz Stampfl recommended the hammer after seeing him perform. He had instant success winning the Victorian Title in 1958 in his first state title. Then except for 1968, 1971 and 1972 he won every National Title from 1959 through to 1973, twelve times and nine in succession.

Dick represented Australia on several occasions, in Perth in 1962 and Jamaica in 1966, and for the British Commonwealth against the USA in Los Angeles in 1967. He was also Australia's first 60 metre thrower in 1959 and increased the National record to 63.11 m in 1964.

Gus Puopolo (VIC) started throwing along with a group of other boys at Tech. High School, in Melbourne, coached by his P.E. teacher. During his first two years as a thrower he won two bronze medals in the Victorian Under 19 Championships. His first throw with the senior hammer was approximately 30 metres and until the age of 21 continued to improve about 2 metres per year. Gus started to train with Dick Leffler, Mike Edwards and Nick Regos, and in 1971 competed in his first Australian Championships, finishing fifth with a throw of a little over 51 metres.

Later in 1971 he went to Germany for two and a half years and improved during the first year to 52.26 metres, and the next to 60.56 metres. By the end of 1973 he had thrown 62.90 metres, and then in 1974 won his first National Title. He was unlucky not to be

selected for the Commonwealth Games team for Christchurch.

Gus continued his National winning streak until beaten in 1980 by brother-in-law, Loris Bertolacci, finishing third with 61.56 m. He again won in 1981.

Gus represented Australia both at the World Cup in 1981, and the Commonwealth Games in 1978 and 1982. In both his Commonwealth appearances he finished 8th with the same distance of 59.74 m. Since then he has established himself as a leading coach in Victoria.

Hans Lotz immigrated from West Germany in 1981, as a 70 metre thrower, and instantly became a major influence in hammer throwing in Australia. Hans won all National Titles from 1982-1985, and threw over 70 metres on several occasions.

He represented Australia at the 1982 Commonwealth Games and finished 4th with 68.82 m, while injured. He was the Australian representative at the first World Championships in 1983 and again represented at the 1986 Commonwealth Games, aged 39.

Joe Quigley trained under Hans Lotz, winning two National Titles 1986 and 1989 plus a swag of medals in the shot and discus. Joe's 1989 win interrupted the long list of titles that Sean Carlin was to win.

Joe along with Phillip Spivey and Hans Lotz represented Australia in the 1986 Commonwealth Games. At the Commonwealth Games he finished 5th in the hammer (69.30 m) and 2nd in the shot (17.97 m). In the same hammer competition Phillip Spivey threw a personal best on his last throw, moving from 5th to 3rd with 70.30 metres for the bronze medal.

One hammer thrower who has never won an Australian Title yet deserves a mention here is Peter Farmer. Peter had a profound influence on the hammer from the mid 1970s through to the mid 1980s, both as an athlete and a motivator and coach.

Peter began throwing in Sydney under coach Tom Mullins. He reached 52.56 metres before attending El Paso University in Texas. Peter immediately made rapid gains, largely due to an extensive weight training programme.

He was selected for the 1974 Commonwealth Games in Christchurch, where he finished with the bronze. The gold medal followed four years later in Edmonton.

Peter represented Australia in two Olympic Games where in 1976 he finished 12th with 68.00 metres and in 1980 13th with 69.16 metres. He is also one of the few Australian medal winners in a World Cup, finishing third in 1977 ahead of Olympic Champion Yuri Sedykh with 73.92 metres.

In his time as a thrower in Australia he increased the National record by twelve metres to 75.90 metres. Other achievements include the French National Titles and the Pacific Conference Games.

After the Olympics in Moscow 1980, he took up residency in the USA, and for a short time in 1984 held the USA record at 75.88 metres.

Between 1984 and 1985 Peter returned to Australia to coach hammer and polevault at the Australian Institute of Sport, but family commitments required him to return to the USA.

Sean Carlin won his first National title in 1987 with 70.36m, only a year after narrowly missing the Commonwealth Games team and finishing 7<sup>th</sup> with 67.66 (7.26kg) at the World Juniors. He was a very consistent competitor and the first to increase the Australian record since Peter Farmer to 77.58m.

Sean competed in two Commonwealth Games 1990 & 1994 finishing 1<sup>st</sup> both times. He also represented Australia in two Olympic Games 1992 & 1996, and two World Championships 1991 & 1995.



Stuart Rendell started throwing hammer in late 1991 having had a successful career as a Junior discus thrower and volleyball player. Stuart had a very good grounding in all areas of training up to this point having trained under Merv Kemp at the AIS. Stuart made rapid gains in his technique, strength and maintained his dynamic speed still running 100 in 10.81s as a 92kg 19yr old.

Stuart finished 2<sup>nd</sup> in the 1995 Nationals to Sean Carlin with 67.32m. The following year he also finished 2<sup>nd</sup> with 72.32m.

The ACT giant emerged from the shadow of Sean Carlin during the '97 season. He then won Commonwealth gold in 1998, Stuart became a world beater and on a tour of South Africa in March 2000 he broke the Australian record throwing 77.68m to beat some of the world's best. With an Olympic "A" Standard Qualifier and a win at the Telstra Olympic Trials Stuart was selected for the 2000 Olympic team to contest the Hammer Throw where he was unable to progress past the qualifying round with a best throw of 72.78m. Competing on his home ground at a meet in Canberra, he raised his Australian record to 78.40m. Stuart prepared for the 2001 World Championships from his base in Hungary where he twice raised the national record with throws of 78.90m and 78.93m. Upon arrival in Canada, he again bettered the record 78.99m (not approved due to unsurveyed ground), but at the World Championships he unfortunately missed qualifying for the final with a best throw of 75.00m, requiring only 76.92m to proceed into the final. Enjoyed a solid 2002 domestic season and in April, won his 6th consecutive national title with a seasonal best of 78.80m - the longest throw ever recorded at the Nationals. At the 2002 Commonwealth Games, Stuart just missed out on a medal, placing 4th in the final (throwing 5 fouls better than the winning distance). In good form domestically in 2003 he missed his own national record by 9cm with a best of 79.20m. In April claimed his 7th consecutive national title. At the 2003 World Championships in Paris he qualified for his first ever World or Olympic final, where he placed 10th. His throw of 76.56m was the best ever by an Australian in championships competition. In February 2004 won his 8th consecutive national title. In July he was named in the 2004 Olympic team. In Athens, he threw 72.61m in the qual round. In February 2006, won his tenth consecutive National Hammer Throw title with 76.33, he followed this up with his second Commonwealth Games Gold Medal with a games record 77.53.



### Women

Bernadette Serone was the first woman in Australia to take the event into respectability when it was introduced as a women's event in the 1987 national Championships (long before it was contested as an IAAF recognized event). Bernadette kept control of the event until Debbie Sosimenko took over in 1992.

Debbie Sosimenko was a pioneer of this event for women, Debbie first set an Australian record in March 1992 when she threw 49.80m. It only took 11 months until she took the record through the 60m barrier, with her sixth Australian record in January 1994. Debbie headed the world rankings in 1994 with a best throw of 62.38m. Raised her Australian record for the 17th time at the Commonwealth Games trials in 1998, and went on to take the inaugural Commonwealth title. Debbie returned from a back injury in 2000 and at a pre-Olympics meet held in Nudgee Debbie continued to improve her personal best throwing a record of 67.22m. She just missed the medals at the Sydney Olympics throwing her 19th Australian record (67.95m) on her first attempt to finish fifth. Post Olympics switched coaches and battled a serious back injury. Resumed competition in late 2001, but missed Commonwealth games selection. She continued to progress in 2003, placing 3rd at the nationals. Quit her job in late 2003 to concentrate on training for Athens. Started the 2003/04 domestic season ranked No 4 in Australia, but became the first Australian to achieve an Olympic A qualifier when she hit 67.82m in November 2003.

Bronwyn Eagles started competing in Little Athletics and drifted into the throwing events. She was a

competitive shot putter, but started to really excel in the hammer. Over the next few years she broke every Australian age record, starting at U16's in 1996. In 1998 she was selected to compete in the 1998 World Juniors. Won the 2000 National Championships held at Stadium Australia. At the 2000 Olympic Trials she placed 3rd, just 5cm behind Debbie Sosimenko who would eventually place 5th at the Olympics. In the absence of an injured Sosimenko, Bronwyn compiled a superb series of throws during the 2001 Telstra Athletics Grand Prix, where she twice raised the Australian and Commonwealth records. Her best performance in the Telstra Athletics Grand Prix in Hobart would have placed her 4th in the Sydney Olympics. She defended her national title in March 2001 and then won gold in her senior international debut at the East Asian Games in May. Travelled and competed extensively on the IAAF Grand prix circuit in America, Asia and the Middle-east. Prepared very well for the World Championships twice raising her personal best (69.24 and 70.19, on an unsurveyed venue) in competitions in Calgary. At the World Championships in Edmonton, Bronwyn still only 20, proved she was a big meet performer qualifying No 2 for the final and secured the bronze medal with her second round Australian and Commonwealth record throw of 68.87m. Upon return to Australia she placed 5th in the Goodwill Games and was 2nd in the IAAF Grand Prix final in Melbourne. Bronwyn was rewarded with a No 4 Track and Field News merit ranking - the highest position by an Australian woman in 2001. She continued to impress during the 2002 Telstra A-Series raising the National and Commonwealth records with throws of 69.38m, 69.85m and equal best 69.65m. What was particularly pleasing was the first record was at her home track, within one mile of her. Won her third straight national title in April 2002 and was named in the Commonwealth Games team. After only qualifying for the Commonwealth Games final with her third and last throw in the qualifying round, Bronwyn struggled in the final claiming the silver medal with 65.24m. In the 2002 World Cup in Madrid, Bronwyn threw below her PB recording a distance of 63.49m to place 7th. She returned to her best during the 2003 domestic season, finally reaching the 70m barrier with a throw of 71.12m at the Telstra A-Series meet in Adelaide. She hit 70 again in Canberra, but surprisingly was bettered in the national championship by Brooke Krueger. She then threw 67.10m in Osaka in May to finish third, again behind Aussie rival Krueger. At the World Championships in August 2003, she did not qualify for the final, throwing 64.97m in the qualifying round. Bronwyn won the 2004 Olympic trials with a season best of 67.92m. In Athens Bronwyn threw 64.09m to place 32nd in the qual rounds. In March 2005 she defended her national title, winning

her fifth Australian Open Championship. She announced her retirement in late 2005.



Expect Brooke Kruger-Billett to take over where Bronwyn left off. Brooke is married to Darren Billett another hammer thrower (2<sup>nd</sup> in the Commonwealth trials 2006) and is coached by Paul and Sean Carlin. Brooke won the 2006 Nationals with 70.72m and the Commonwealth Games Gold with 67.90m.



## AUSTRALIAN RECORD PROGRESSION

### Men

43.22	W.J. O'Reilly	NSW	21/02/1914
43.90	Myer Rosenblum	NSW	21/05/1935
44.45	Keith Pardon	NSW	11/12/1937
45.93	Keith Pardon	NSW	//1941
46.49	Keith Pardon	NSW	//1944
47.84	Keith Pardon	NSW	24/02/1945
48.20	Keith Pardon	NSW	10/03/1951
49.52	Keith Pardon	NSW	28/01/1952
53.03	Tom Mullins	NSW	08/11/1952
54.74	Charlie Morris	NSW	28/01/1957
56.46	Charlie Morris	NSW	23/03/1958
58.75	Dick Leffler	VIC	29/11/1958
60.59	Dick Leffler	VIC	10/12/1960
60.93	Dick Leffler	VIC	18/02/1961
62.15	Dick Leffler	VIC	17/03/1964
63.11	Dick Leffler	VIC	04/07/1964
67.64	Peter Farmer	NSW	02/06/1972
70.26	Peter Farmer	NSW	07/06/1975
73.92	Peter Farmer	NSW	03/09/1977
75.90	Peter Farmer	NSW	14/08/1979
77.58	Sean Carlin	SA	11/02/1994
77.68	Stuart Rendell	ACT	??/??/2000
78.40	Stuart Rendell	ACT	??/??/2000
78.93	Stuart Rendell	ACT	??/??/2001
79.29	Stuart Rendell	ACT	07/07/2002

### Women

49.80	Debbie Sosimenko	NSW	??/03/1992
58.90	Debbie Sosimenko	NSW	17/01/1993
60.30	Debbie Sosimenko	NSW	20/01/1994
61.46	Debbie Sosimenko	NSW	12/04/1994
62.38	Debbie Sosimenko	NSW	19/04/1994
63.04	Debbie Sosimenko	NSW	12/04/1995
63.22	Debbie Sosimenko	NSW	03/03/1995
63.60	Debbie Sosimenko	NSW	21/03/1995
63.92	Debbie Sosimenko	NSW	21/03/1995
65.24	Debbie Sosimenko	NSW	15/07/1995
65.68	Debbie Sosimenko	NSW	15/07/1995
65.89	Debbie Sosimenko	NSW	13/03/1997
66.70	Debbie Sosimenko	NSW	14/03/1998
67.16	Debbie Sosimenko	NSW	10/08/1998
67.22	Debbie Sosimenko	NSW	06/09/2000
67.95	Debbie Sosimenko	NSW	29/09/2000
68.73	Bronwyn Eagles	NSW	18/02/2001
68.83	Bronwyn Eagles	NSW	11/03/2001
68.87	Bronwyn Eagles	NSW	07/08/2001
69.38	Bronwyn Eagles	NSW	10/02/2002
69.65	Bronwyn Eagles	NSW	23/03/2002

69.65	Bronwyn Eagles	NSW	14/04/2002
71.12	Bronwyn Eagles	NSW	06/02/2003

## AUSTRALIAN AMATEUR ATHLETIC CHAMPIONS

### Men

(Up to 1927 this event was known as the "Australasian" Championships).

1893	T.O'Connor	NZ	26.40
1896	R.Martin	NZ	31.89
1897	J.Milward	NSW	29.42
1899	W.H.Madill	NZ	39.66
1901	W.J.O'Reilly	NSW	39.47
1904	W.J.O'Reilly	NSW	39.65
1905	W.J.O'Reilly	NSW	41.21
1908	J.Kearney	QLD	38.26
1909	W.J.O'Reilly	NSW	39.63
1911	D. McGrath	QLD	39.29
1914	J.W.McHolm	NZ	42.05
1920	J.W.McHolm	NZ	39.84
1922	R.H.Rouse	VIC	36.82
1924	J.W.McHolm	NZ	39.96
1926	W.Harvey	NZ	43.72
1927	W.Harvey	NZ	43.62
1930	Not held		
1932	Not held		
1934	M.Rosenblum	NSW	43.28
1936	M.Rosenblum	NSW	40.56
1937	K.W.Pardon	NSW	44.45
1947	K.A.Allen	WA	47.80
1948	K.A.Allen	WA	44.45
1949	K.A.Allen	WA	45.51
1950	K.W.Pardon	NSW	46.63
1951	K.W.Pardon	NSW	47.39
1952	K.W.Pardon	NSW	49.50
1953	K.W.Pardon	NSW	47.76
1954	T.L.Mullins	NSW	48.75
1955	K.W.Pardon	NSW	48.60
1956	H. S. Barker	NSW	47.79
1957	C.Morris	NSW	48.80
1958	C.Morris	NSW	52.28
1959	R.H.Leffler	VIC	58.80
1960	R.H.Leffler	VIC	57.38
1961	R.H.Leffler	VIC	58.72
1962	R.H.Leffler	VIC	58.16
1963	R.H.Leffler	VIC	58.46
1964	R.H.Leffler	VIC	59.85
1965	R.H.Leffler	VIC	59.13
1966	R.H.Leffler	VIC	60.69
1967	R.H.Leffler	VIC	59.90
1968	W.Grob	VIC	60.02

1969	R.H.Leffler	VIC	55.78
1970	R.H.Leffler	VIC	59.36
1971	R.Frawley	QLD	56.56
1972	R.Frawley	QLD	59.18
1973	R.H.Leffler	VIC	56.72
1974	G.Puopolo	VIC	58.16
1975	G.Puopolo	VIC	57.24
1976	G.Puopolo	VIC	62.26
1977	G.Puopolo	VIC	60.80
1978	G.Puopolo	VIC	61.54
1979	G.Puopolo	VIC	63.16
1980	L.Bertolacci	VIC	63.08
1981	G.Puopolo	VIC	63.40
1982	H.Lotz	VIC	67.50
1983	H.Lotz	VIC	69.28
1984	H.Lotz	VIC	66.86
1985	H.Lotz	VIC	70.02
1986	J.Quigley	VIC	72.86
1987	S.Carlin	SA	70.36
1988	S.Carlin	SA	73.06
1989	J.Quigley	VIC	71.22
1990	S.Carlin	SA	70.46
1991	S.Carlin	SA	70.06
1992	S.Carlin	SA	74.20
1993	S.Carlin	SA	74.74
1994	S.Carlin	SA	74.72
1995	S.Carlin	SA	70.28
1996	S.Carlin	SA	75.18
1997	S.Rendell	ACT	75.90
1998	S.Rendell	ACT	75.15
1999	S.Rendell	ACT	70.79
2000	S.Rendell	ACT	74.71
2001	S.Rendell	ACT	77.76
2002	S.Rendell	ACT	78.80
2003	S.Rendell	ACT	76.61
2004	S.Rendell	ACT	77.40
2005	S.Rendell	ACT	74.35
2006	S.Rendell	ACT	76.33

## Women

1987 was the first time the event was held and was held as an invitation.

1987	B. Serone	NSW	40.18
1988	B. Serone	NSW	45.74
1989	J. Capper	NSW	41.62
1990	J. Capper	NSW	41.62
1991	B. Serone	NSW	48.44
1992	D. Sosimenko	NSW	49.80
1993	D. Sosimenko	NSW	57.58
1995	D. Sosimenko	NSW	63.22
1996	D. Sosimenko	NSW	59.50
1997	D. Sosimenko	NSW	65.68
1998	D. Sosimenko	NSW	66.72
1999	D. Sosimenko	NSW	62.04
2000	B. Eagles	NSW	62.67
2001	B. Eagles	NSW	63.61
2002	B. Eagles	NSW	69.65
2003	B. Eagles	NSW	67.40
2004	B. Eagles	NSW	67.92
2005	B. Eagles	NSW	65.43
2006	B. Kruger-Billett	SA	70.72

## ACKNOWLEDGEMENTS

Paul Jeans the AAU Statistician  
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Peter Farmer and Ian Ison for interviews.

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## TALENT SELECTION

Hammer throwers do not need the upper body strength of the shot putter or discus thrower. Strong legs and trunk are more important. Any person can take up the hammer and throw, but to reach the level to become an international, the athlete ideally would have the potential height of 1.80 - 1.90 metres, and 100-115 kg body weight.

Along with these physical traits they need to be powerful. Power can be measured using a variety of tests. Those that are particularly suited to the thrower are the overhead shot throw, 3 spring jumps, standing long jump, 30 metre sprint (standing start), and the jump reach test. See Training Section for a reference table.

As well as selecting athletes using the above, easily measurable criteria, there are other factors that will determine the athlete's potential. These include agility, rhythm, reflexes and speed as well as an ability to convert verbal instructions into actions.

Having determined the natural potential of the athlete, the coach must then formulate a training programme so that the athlete can realise that potential.

### Biomechanics

Aspects of hammer throwing have changed during the past decades, but the basic mechanics governing the event have stayed the same.

The distance of a hammer throw depends on the hammer's:

1. Release velocity
2. Release angle
3. Height of release
4. Air resistance

The angle of release is approximately 45 degrees and varies only slightly. The height of release is governed by the height of the athlete and like air resistance there is little that the athlete can do to alter this. Even if it were possible to increase the height of release and reduce air resistance, there would be little gain in the overall distance thrown.

For these reasons the coach only needs to ensure that the release angle remains at approximately 45 degrees because the greatest gains come from an

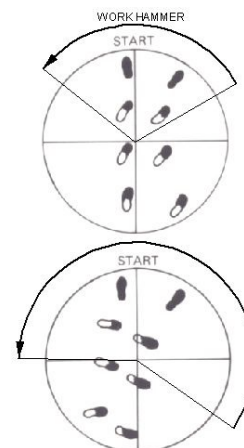
increase in the release velocity of the hammer, see table below:

Release Velocity (ms <sup>-1</sup> )	22	23	24	25	26	27
Approximate Distance (m)	50	55	60	65	70	75

Confirmation of these figures can be found in any Senior High School Physics or Mathematics textbook (Look under the topic of Projectiles).

The release velocity of the hammer is achieved as a result of the cumulation of two swings and either three or four turns. It is during these swings and turns that the athlete produces the release velocity as a combination of 1. angular velocity (turning speed) and 2. radius of the athlete/hammer system.

A major change in technique has increased the World Record from the mid 70 metre throws of the 1970's to the mid 80 metre throws of the 1980's. With an ever increasing number of 80 metre throwers. This first change in technique was seen when a young Youri Sedykh won the 1976 Olympics. Below is a diagram of the foot placement of a thrower from the 1960's and of Youri Sedykh. Sedykh is typical of the Soviet technique of landing early and working the hammer a long way to the left each turn. In the past throwers tried to drag the hammer around and planted their feet back in the same direction as the starting stance. The Soviets changed this. They let the hammer take them into the turn, and planted their right foot early at 270 degrees, this gave them more time to accelerate the hammer into each turn. It is logical that if the thrower could accelerate the hammer through an extra 90 degrees than the result would be greater hammer head velocity and hence greater distance.



## COACHING

The athlete and coach must strive to attain a technique which encompasses both a high angular velocity and a long radius.

The idea is to develop a technique emphasising as long a radius as possible, then add in the speed of turning component. As the athlete matures and increases in strength and technical proficiency, the faster they turn and the further they will throw.

Once the basic technique has been developed the athlete needs to develop distance in his throws. At present the Russians and many other Europeans try to build a dynamic stereotype which is very close to that needed to throw the 7.26 kg hammer for men and 4kg hammer for women world record distances. Building a technique for the 80 m thrower first with the 3 kg hammer, then with a 4 kg, 5 kg, 6kg and 7 kg hammer. It is very important to achieve these distances within 3 to 4 years of initial training with some hammer. It is well supported that once a technique has been stereotyped it is not possible to modify it significantly. Excellent practical results have been obtained through the use of this system as can be seen in the example of the Soviet thrower Igor Nikulin :



Year	Age	3kg	4kg	5kg	6kg	7.26kg
1974	14	66.52	58.40	52.50		
1975	15	75.20	67.60	58.00	54.36	49.92
1976	16		77.80	69.70	60.50	57.52
1977	17		84.40	78.48	73.46	62.18
1978	18			88.70	79.60	71.70
1979	19			95.32	82.86	75.20
1980	20				87.00	80.34
1982	22					83.54
1983	23					82.92
1984	24					82.56
1985	25					78.88
1986	26					82.34
1987	27					82.00
1988	28					83.79
1989	29					78.40
1990	30					84.48
1999	39					71.96
2002	42					69.60

Performance development of Olga Kuzenkova, Russia.

Born: 4 October 1970. body mass 70kg. arm span 1.77m

Year	Age	Result
1990	20	59.50
1991	21	61.52
1992	22	65.40
1993	23	64.64
1994	24	66.84
1995	25	68.16
1996	26	69.46
1997	27	73.10
1998	28	73.80
1999	29	74.30
2000	30	75.68
2001	31	73.62
2002	32	73.07
2003	33	74.98
2004	34	75.02
2005	35	75.10



## The Beginner

Specific exercises and drills form an important part in the training of hammer throwers. The exercises are usually divided into preparation drills, used to introduce, teach and improve the thrower's technique and specific strength development exercises. The preparation drills, employed during the learning stage of the event, are mostly made up of imitation turns.

Exercises recommended to introduce beginners to the hammer throw technique involve rotational movements. These movements are usually missing in everyday activities. This means that considerable changes must take place to the co-ordination of the athlete.

Experience has shown that the fastest and most efficient method to introduce young athletes to the hammer is the development of correct leg/foot work. After all, it is the legs and leg action which are the driving force in the throw. I use two main ways to teach the throw, I have modified my ideas over the years and believe that the best way to proceed is to teach the throw as one whole action. There it is important that the athlete does 3 to 4 turn throws right from the start. Multiple turns are used to help develop the turning rhythm.

### NOTE:

All instructions here are assuming that you are dealing with a right handed thrower.

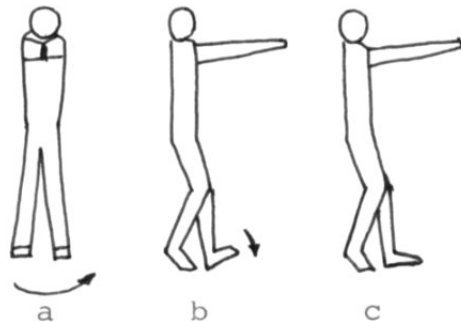
The left foot contact with the ground changes, from heel to the ball of the foot, but it never loses contact with the ground.

## The Beginner without the Hammer.

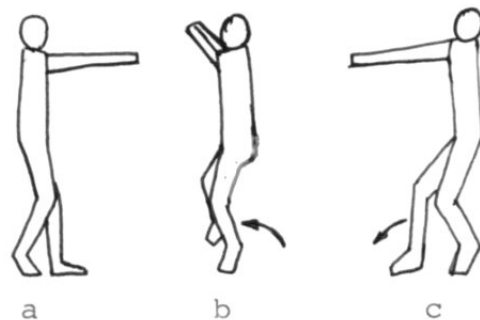
1. Starting position - standing with the legs about shoulder width apart, slightly flexed in the knees. The left foot is placed on the heel, the right foot on the ball. Perform 90 degree rotations to the left.



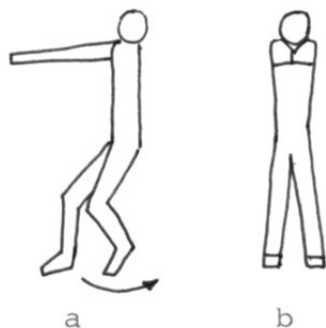
2. Starting position - as in exercise 1. Perform 90 degree rotations (as in exercise 1), but at 90 degrees place the ball of the left foot on to the ground.



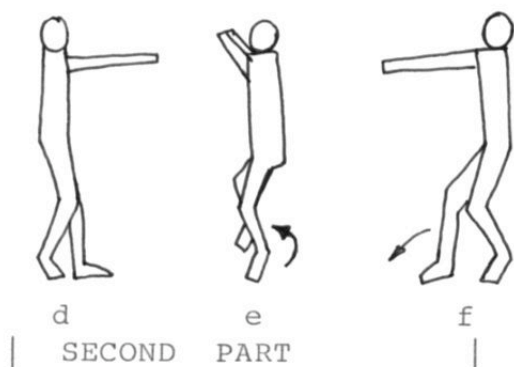
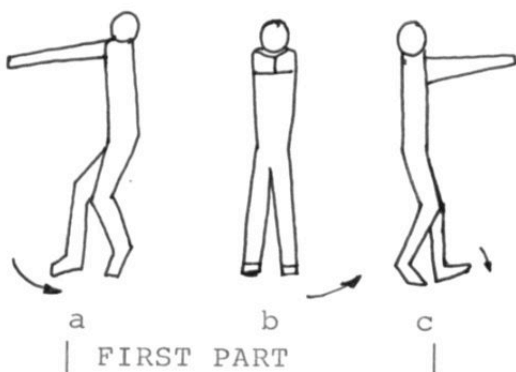
3. Starting position - start with the left foot forward, as in the finish position in exercise 2. Lift the right foot off the ground and step around to 270 degrees using an active rotation on the ball of the left foot.



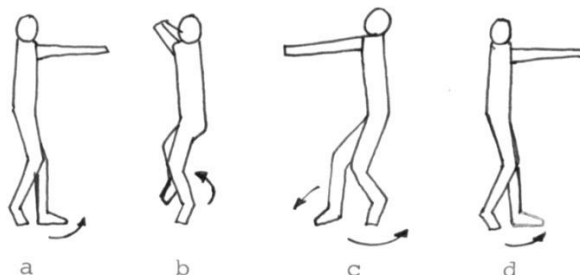
4. Starting position - start with the right foot forward, as in the finish position in exercise 3. Continue the rotation on the balls of both feet from 270 degrees to 360 degrees.



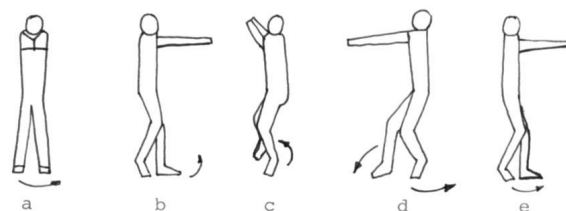
5. The 0-90 degree movement only consciously occurs in the first turn. Starting position - start with the right foot forward as in the finish position in exercise 3. Complete rotations from 270 to 90 degrees, without stopping at the 360/0 degree point (FIRST PART). Complete the movement 90 to 270 degrees (SECOND PART).



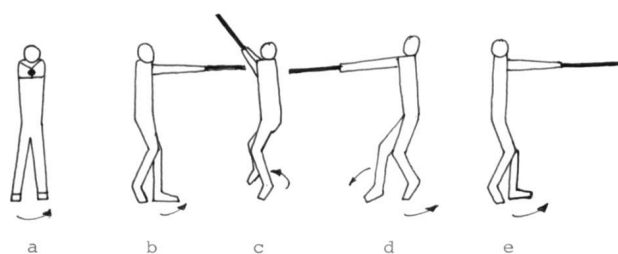
6. Starting position - start with the left foot forward as in exercise 3. Make continuous turns from 90 degrees back to 90 degrees. Continue these without stopping. It is not overly important if the left foot moves from heel to ball of the foot absolutely correctly at this stage. This movement will naturally occur when using a hammer due to its pull.



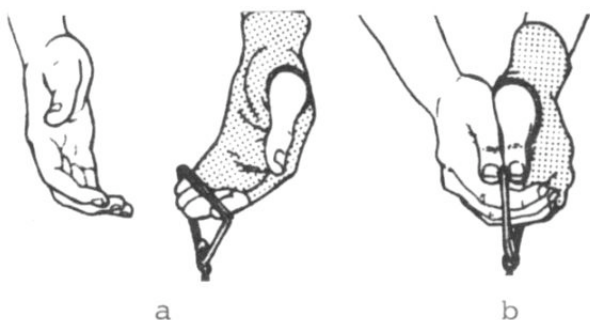
7. Starting position - as in exercise 1. Make the movement 0 to 90 degrees plus three complete turns as in exercise 6.



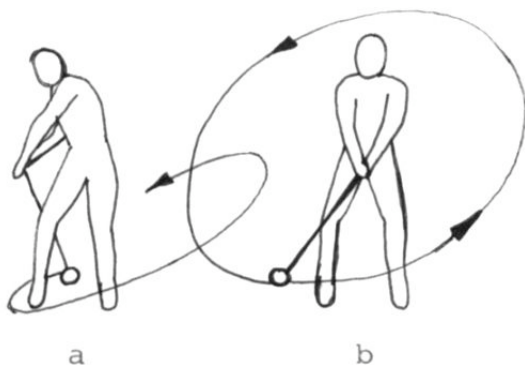
8. Starting position - as in exercise 1. Carry out complete turns holding a stick, broom handle or softball bat.



- 9 **Moving on to using the hammer.** Starting position - as in exercise 1. Holding the hammer as shown, left hand first, right one over. Swing the hammer to the left and around, making sure the arms straighten when the hammer is in-front of the athlete.



10. Starting position as in exercise 9. Start swinging the hammer. Move the low point to the right, to the left, in front of the athlete. Make 4-5 swings in each of these positions, so the athlete develops a control and a confidence with the hammer.



11. The athlete may now at long last have an attempt at throwing the implement. Make two swings, the first slightly to the right the second

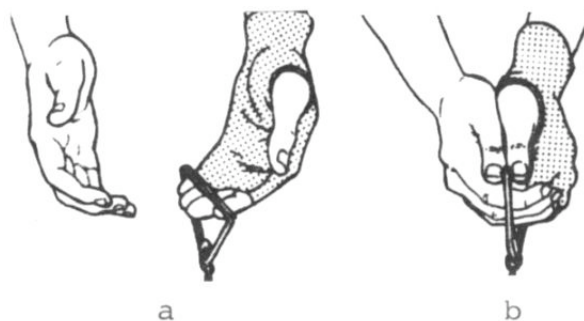
more towards the front. Carry out turns and throw. Easier said than done, but persist and the athlete will be carrying out three "rough" turns in a very short time.

- 12 Multiple turns - on a large concrete area. Have the athlete carry out as many turns with the hammer as possible. 4-5 sets of a minimum 4 turns, build this up to 5-10 sets of 15-20 turns. This is a very good exercise for all levels of hammer thrower as it helps to develop continuity of the turning action.
- 13 Set home work - have the athlete perform the drills without the hammer at home.

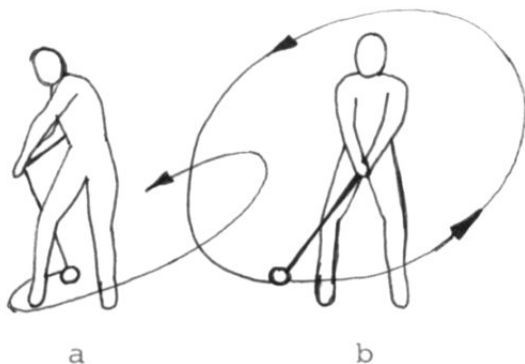
### The Beginner with the Hammer.

I call this learning to walk.

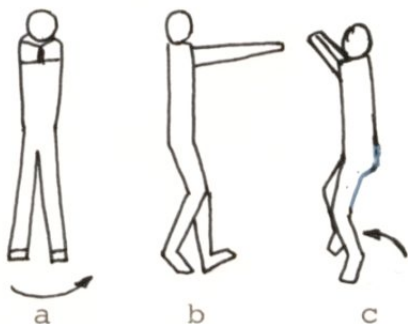
1. Starting position - Holding the hammer as shown, left hand first, right one over. Swing the hammer to the left and around, making sure the arms straighten when the hammer is in-front of the athlete.



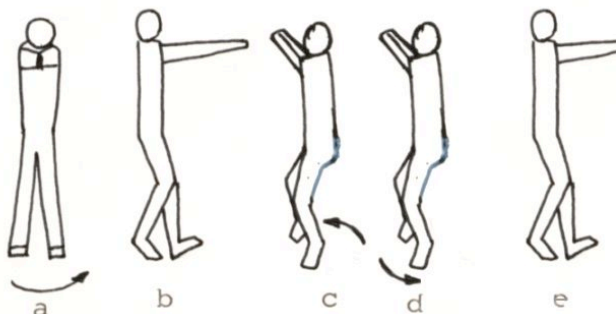
2. Starting position as in exercise 1. Start swinging the hammer. Move the low point to the right, to the left, in front of the athlete. Make 4-5 swings in each of these positions, so the athlete develops a control and a confidence with the hammer.



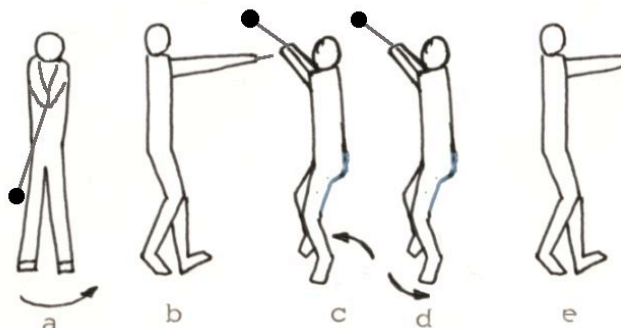
3. Without the hammer. Starting position - standing with the legs about shoulder width apart, slightly flexed in the knees. The left foot is placed on the heel, the right foot on the ball. Perform 90 degree rotations to the left. Then step to 180 degrees.



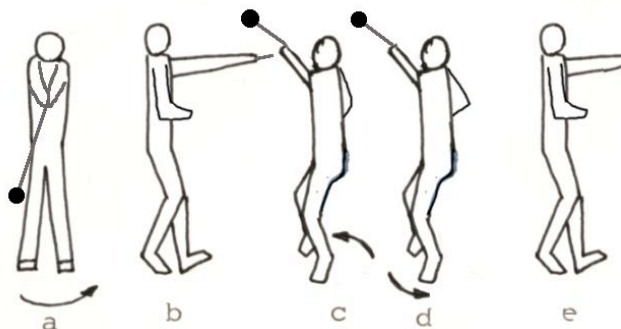
4. Without the hammer. Starting position - standing with the legs about shoulder width apart, slightly flexed in the knees. The left foot is placed on the heel, the right foot on the ball. Perform 90 degree rotations to the left. Then step to 180 degrees. Then from 180 degrees go around to 180 degrees again lifting the right leg only off the ground. Repeat this a few times 180 to 180.



5. Repeat 4 with a hammer. Keep the hammer moving as slowly as possible, the emphasis is on stepping to 180.



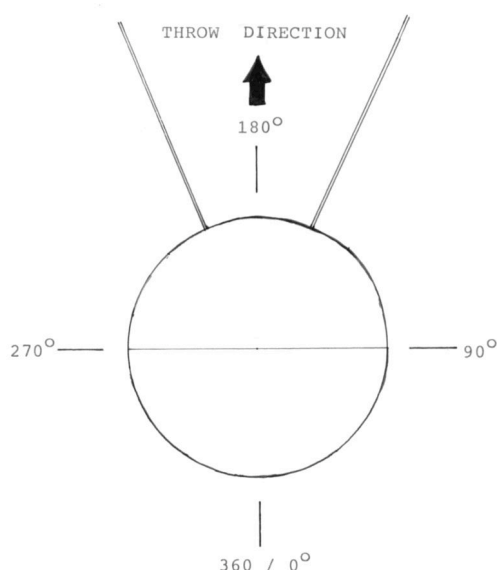
6. using the left hand only. Make two slow swings make the left arm go well to the left (90 Degrees) into the entry. The left arm takes the thrower into the throw, step to 180 each time. If the athlete has trouble swinging, then swing with both arms and release the right arm as they go into the entry.



### How this works

1. The athlete doesn't think of turning the feet or the body around, they only need to remember to walk.
2. This also stops the athlete from turning around like a discus thrower, by stepping through or walking it helps prevent lifting off too soon.
3. There is no need to talk about heel and toe turns, just walk, as the hammer pull increases the countering of the pull with the body naturally transfers the weight from heel to toe. This is then backed up by sets of multiple turns.
4. It emphasises working the hammer to the left each turn.
5. The thrower tries to land at 180, as everything gets faster they end up landing at 270. This is because of their reaction time and the fact that the hammer is taking them around.

I have had great success with this and have had all sorts of athletes, coaches, mums and dads doing 3 turns in about an hour.



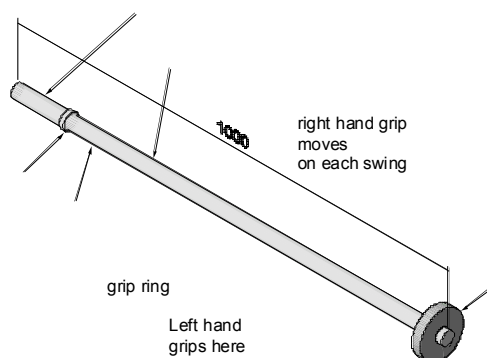
are now holding the bar like a left hander, ready to go back the other way. This exercise is similar to hitting a ball, but not the same, the emphasis is still on using the whole of the body.

a) swing the bar left and right repeatedly, swapping the right hand in each direction. Left right - left right - left right - left.....

b) repeat this several times then when the bar goes to the left ( like an entry) keep both hands firmly on the bar and allow the inertial of the bar take the thrower around to 270 degrees. Left right - left right - left right - left and around into a turn.

Other Drills that I include that I find are good for learning the basics of turning:

1. Use a softball bat to go through the positions that the thrower is trying to get into.
  - a) 0 degrees
  - b) 90 degrees
  - c) 270 degrees
  - d) back to 90 degrees
2. Use a heavier 'bat' to repeat these drills. We have a piece of pipe and a 1.25kg weight disk on the end as shown below.



To start the drill hold the bar like a softball bat. The left hand grips just above the safety ring, the right hand above that. Swing the bar like hitting a ball. To stop the bar take the right hand off and catch the bottom of the bar. You

## ***FURTHER DEVELOPMENT***

Once the athlete has been throwing a short time and they have some idea of what is happening to themselves and the hammer, it is time to advance their technique.

During the single support (left leg only on the ground) phase, the right side/leg must overtake the hammer and land at 270 degrees before the hammer (hammer at about 220 degrees). The athlete does this so that they can accelerate the hammer into the next turn. The following ideas may help to develop this:

1. Make sure the athlete does not lift the right foot off before the 90 degree point. Coming off early causes the right leg/side to "lock on" with the hammer and the right foot will land with the hammer, well past the 270 degree point.
2. Have the athlete think of stepping through to 180 degrees during each turn. What happens, due to the turning action of the hammer/thrower system is that the foot will actually land at 270 degrees "time to react situation" as explained earlier.
3. It is very important that the athlete achieves the correct position at 90 degrees, and keeps the hammer as long as possible at the back of the circle (180-220 degree area). The athlete must have the sensation of the hammer "running away" at the back of the circle. The thrower feels a stretching of the shoulders towards the hammer.
4. Once the right leg has landed it is very important for it to do the driving into the next turn, not the left leg, the right drives around an almost "passive" left leg.
5. The hips and shoulders remain parallel throughout the throw. No noticeable hip lead as in the shot, discus, or javelin. This helps keep the radius of the athlete hammer system as long as possible.
6. Multiple turns are very useful but they do not help to develop the correct rhythm of acceleration. The most important exercise is the complete throw. If you need to work on technique it is important to work on the whole throw.
7. Once the athlete can carry out turns and throw, they should use a heavier than normal hammer to help develop the correct movements. First learn the movement slowly and then as the movement becomes

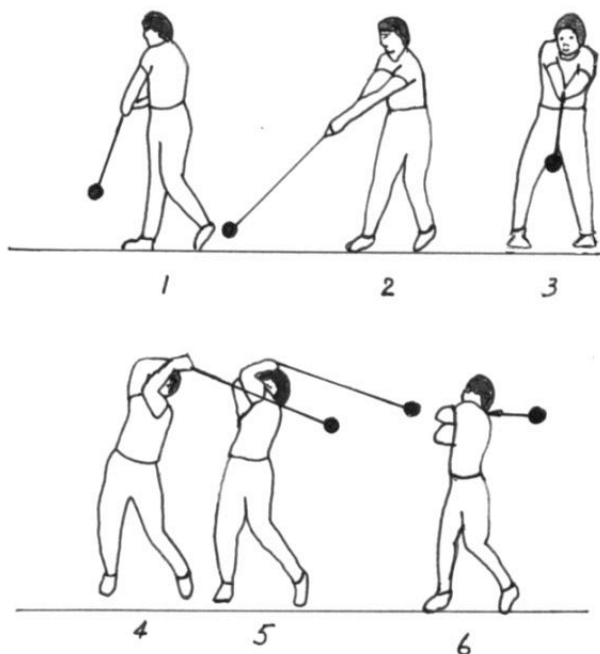
more fluent they will be able to do the same with a lighter hammer at much greater speed.

8. Throw with the right arm only, emphasise pushing the hammer long to the left and passing the feet on entry, the feet follow the hammer into the first turn.

9. Throw with the left arm only, emphasise pushing the hammer long to the left and passing the feet and shoulders on entry, the feet follow the hammer into the first turn, then need to work quickly to get under the hammer at 270.

10. Throw with the right hand in the handle first with the left one over the top. This helps develop the feeling of the hammer being long to the left at entry and prevents the left shoulder leading into the turns.

## THROW SUMMARY



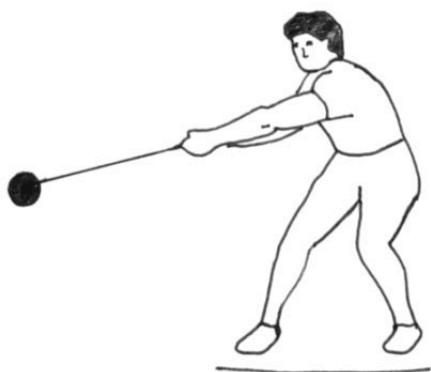
**SWINGS** - which number two for most throwers.

The aim of which is to instil an optimum to place the ball on the correct plane. Lift the hammer up and around during each swing, this sets the rhythm for the whole throw. The hammer should be actively accelerated from the high point( position 6) all the way through to 90 degrees to the left. The hands and arms are active throughout and the legs are passive.

1. Start the swings by lifting the hammer with the hands and arms
2. Scribe a large arc

### **AVOID:**

1. Allowing the swings to drop below knees arc around the body with the hammer



### **ENTRY TO THE FIRST TURN**

From position 6 to the end of the DSP is similar to wood chopping with an axe ( if you know how to do that) The left side remains braced throughout. The head and eyes focus to the side and remain on the hammer in the entry.

1. Transfer of weight from right to left foot
2. Left foot on the ball, left leg flexed
3. Right foot is flat
4. Left shoulder flat and relaxed
5. The head and eyes remain focused on the hammer

### **AVOID:**

1. Opening the left foot - turning the left foot to early, the foot should point at the-hammer through the first 90 degrees of rotation - can cause a straightening of the left leg, which in turn causes the athlete to land heavily on the right foot
2. Opening the left shoulder - pulling the left shoulder into the turn before the hammer has had a chance to complete its arc - reducing radius and rushes the throw from 90-270 degrees ( no-discus entry)

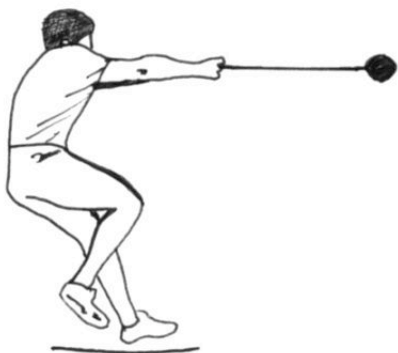


### LOW POINT

1. Low point of the ball's trajectory in front of the thrower
2. a) Left foot fixed flat on the ground **3 Turns**  
b) Left foot ball of foot on the ground **4 Turns with toe turn**
3. Shoulders relaxed, hands kept away from flexed knees
4. Shoulders and hips in the same plane
5. Head in the direction of the ball

### AVOID:

1. Opening the left foot
2. Passage of the head and shoulder to the left
3. Allowing the shoulders to slump forward ( no-good-morning )



### DOUBLE TO SINGLE SUPPORT

1. 90 degree rotation to the left
2. Stretch the muscles of the back, shoulders and arms
3. Look at the ball
4. a) Weight remains on heel of left foot **3 Turns**  
b) Weight remains on ball of left foot **4 Turns**

### AVOID:

1. Opening the left foot
2. Straight left leg
3. Reduced radius by a) head b) bending of arms c) contraction of the shoulders
4. Lifting the right foot before 90 degrees
5. Inactive right foot
6. Hammer above shoulder height

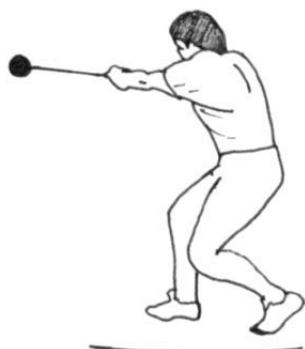


### **SINGLE SUPPORT 1<sup>ST</sup> TURN ( BALL TO THE HIGH POINT)**

1. Shoulders and hips in the same plane
2. Shoulders relaxed on the horizontal axis
3. Look in the direction of the ball
4. Maximum stretch of the back muscles
5. Active rotation of the ball of the left foot, foot pointing at the hammer ball
6. The right leg moves quickly ( active), stepping through

#### **AVOID:**

1. All reductions in radius
2. A rising action of the body
3. Pulling back the head
4. Pulling back the shoulders



### **RIGHT FOOT LANDING FIRST TURN**

1. Left hip to the vertical of the left foot on the ball (flexed left ankle)
2. It is the turning of the left ankle that causes the right foot to land early
2. Look in the direction of the ball
3. Right foot on the ball perpendicular to the thrower's hip axis
4. Shoulders stretched. Stretching of the large left latimus dorsi and left oblique that aids in the acceleration of the ball during the decending phase
5. Feel like you are lowering the hips or sitting down

#### **AVOID:**

1. Landing with the hips to the front
2. Turning head to the left
3. Bending the arms
4. Pulling on the hammer



### **LINKING 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> TURN TO THE LOW POINT**

Acceleration of the ball will be produced during the decent to the low point by the contraction of the left lat.dorsi and left oblique (pre-stretched), and the active rotation on the right foot, while maintaining a fixed left side.

1. Active rotation of the right foot on the ball, right knee flexed
2. Shoulders relaxed in the same plane as the pelvis
3. Left foot flat on the ground (sensation slow)
4. Left side (foot, hip and shoulder) fixed
5. Feel like the whole body turns together with the hammer

#### **AVOID:**

1. Opening the left foot
2. Opening the head and left shoulder
3. Dragging the hammer - pulling with the upper body and arms, causing a shorter radius

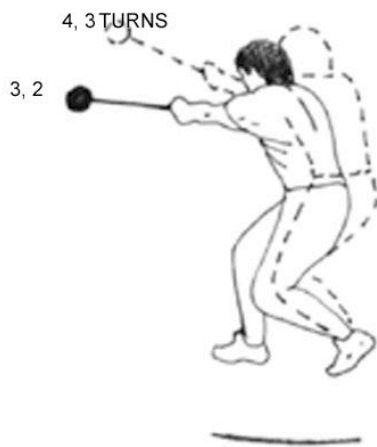


### **DOUBLE TO SINGLE SUPPORT**

1. Rotation in the double support to the left (90 degrees). Right foot on the ball, left foot on the heel
2. Left foot, knee, hip and shoulder in the same plane
3. Look in the direction of the ball
4. Shoulders relaxed
5. Shoulders and pelvis parallel

#### **AVOID:**

1. Faults of head, shoulders and arms
2. Opening the left foot
3. Taking the right foot off too soon (90 degree minimum)
4. Inactive right foot



#### **FOOT LANDING DURING 2<sup>nd</sup>, 3<sup>RD</sup> & 4<sup>th</sup> TURNS**

1. Body weight on the ball of the left foot
2. Right foot on the ball
3. Look in the direction of the hammer
4. Shoulders relaxed, muscles of the back stretched

#### **AVOID:**

1. Landing with the hips to the front
2. Turning the head to the left
3. Bending the arms
4. Pulling on the hammer

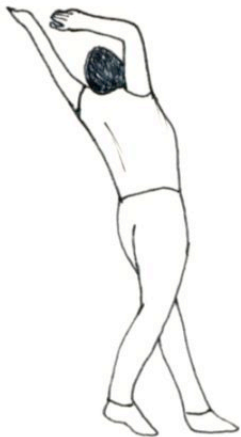


#### **DELIVERY**

1. The legs remain bent until the low point of the hammer's trajectory
2. Active rotation of the right foot proceeds on the ball of the foot in projecting knee and right hip towards the front of the cage
3. Left foot flat on the ground

#### **AVOID:**

1. Straightening the legs too soon
2. An inactive right foot

**RELEASE**

1. Left foot flat on the ground
2. Right foot on the ball
3. Hips oriented 90 degrees to the left

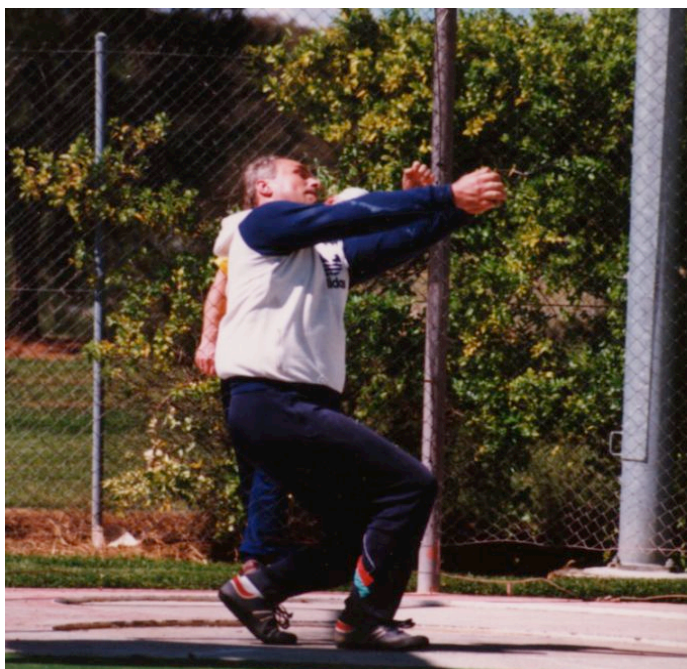
**AVOID:**

1. Fouling
2. Any faults that appear here can usually be traced back to the swings and entry into the first turn

**FINAL NOTE:**

The "Phase" descriptions outlined here are made only to assist the clarity of the text, the throw has a unity and must first be considered as a whole. During the throw each "Phase" is dependent upon the correct performance of the previous "Phase" of the throw, and for a good throw these separate "Phases" blend into a smooth rhythmical whole. The first-class throw is characterised by an ease of execution, which is the essence of skilled performance. The rhythm must be set at the start of the first swing and continued until the release. It is for this reason that a great deal of time must be spent on the correct execution of the swings and entry into the first turn, to establish this rhythm.

## PHOTOS



Three Classic positions of Sedykh, training at the AIS in Canberra Australia Jan1991 ( photos Bob Wagner).

Bondarchuk looks on in Photo 1, the hammer is a long way to the left, past 90 degrees.

Peter Bremner ( Sean and Paul Carlin's coach looks on in the second, the camera was at 180 degree, Sedykh almost at 270 with his left foot, first turn.

Bondarchuk obscured in photo 3, the hammer is long and Sedykh is definitely ready at 270 to work the hammer into another turn.



Australian Mens record holder Stuart Rendell with Ruth Frith, Australia's oldest hammer thrower. Pictured here aged 96 at the Australian Masters Championships in 2006.



My claim to fame photographed here with Sedykh at the AIS Canberra 1991.



Sharyn Angel 57.39m and Stuart Rendell 79.29m at our training area in Brisbane 2006

**Hammer Sequence – Youri Sedykh World Record 86.74m**



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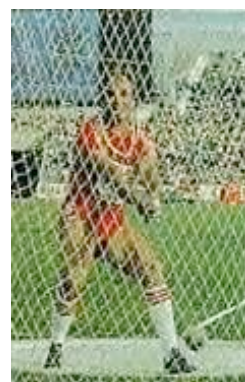
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**Hammer Sequence – Olga Kuzenkova 75.10m World Championships 2005**



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Hammer Sequence – Bob Wagner 65+m Training AIS Canberra 1991



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# Hammer Sequence – Rebecca Oakhill 42+m Training Brisbane 2006



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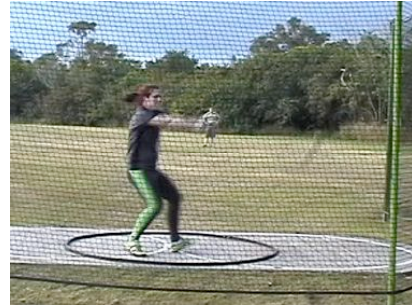
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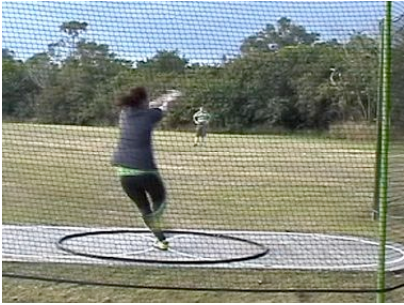
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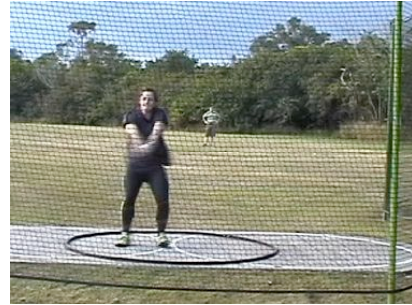
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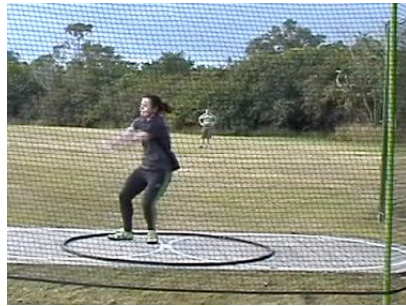
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Rebecca is shown here because she isn't a world champion. Most coaches are dealing with beginner to intermediate level athletes. It is good to see a sound basic technique. Rebecca threw 30.08 at the Queensland state titles in February using a standing throw. Prior to training in our group she had some idea of how to do a single turn but couldn't get throws out of the competition cage. She is shown here throwing 40+m during training five months later.

Training has consisted of throwing twice a week for one to one and a half hours only due to work and university commitments.

Rebecca has a good basic technique with a long. She appears to turn slower than many other throwers, that are throwing the same distance.

#### **Technical Problems:**

She still has some technical problems which we will discuss later.

#### **Training outline:**

Often the routine could be changed to include a testing day or a handicapped competition. This was very helpful with the repetitious nature of the kettlebell and weight throwing.

#### **Months 1 & 2 – Emphasis on turning.**

Approximately half of each training session was devoted to turning drills. My favourite is multiple turns on a tennis court. The aim was to be able to turn continuously across the whole of the court, 28 continuous turns for Rebecca. This she achieved within a month. This goal was then set for every set of turns, and although not always possible it was still attempted. This was followed by throws with the 5kg and 4 kg hammers. Each session was finished with kettlebell or weight throws. All throws she threw with 3 turns, this was only reduced for heavy hammers, the weight and kettlebells.

#### **Months 3 & 4 – Emphasis on controlled turning and good delivery.**

Alternate sessions warm up was either multiple turns or throwing a 4kg kettlebell with 3 turns.

Day 1 throwing 5kg, 4kg 3kg hammers with 3 turns.

Followed by either 6.25, 7.26 or 9kg on a short wire for 1 turn deliveries X10.

Day 2 throwing 6.25, 7.26 or 9kg on a short wire for 1 turn deliveries X 6-8.

Followed 5kg, 4kg 3kg hammers with 3 turns.

#### **Months 5 & 6 – Emphasis on speed of turning.**

Warm up 4kg kettlebell with 3 turns.

Day 1 throwing 5kg, 4kg & 3kg hammers with 3 turns.

Followed by either 7.26 or 10kg weight throw.

Day 2 throwing 4.5kg, 4kg & 3kg hammers with 3 turns (occasionally 2kg). Followed by either 7.26 or 10kg weight throw.

#### **Points that are emphasised in training.**

- Keep the hammer flat in swings.
- Low point in front between the legs
- Work the hammer to the left in the entry.
- Don't turn the legs until the hammer is to the left.
- Active left leg in the single support phase.
- Turn the body as a whole in the double support phase.
- Both legs active in double support phase
- 99% of problems start with the swings and entry. Fix these and fix almost everything.

## PROGRAMMING FOR THE ATHLETE

The following programme is based on **Bondarchuk's Periodization Model**. The year is divided up into three Periods, that of **Active Rest**, **Preparation** and **Competition**. During these Periods the athlete goes through a series of cycles. Each cycle is made up of **General Preparation**, **Special Preparation** and **Technical Training**. The cycles take on the name of the prevalent type of training carried out in that particular cycle, and each cycle builds on the previous one. This method of programming is often referred to as **FUNCTIONAL CYCLING**.

### ACTIVE REST PERIOD: (TRANSITION PERIOD)

This is set into the programme at the beginning of the training year. It is used as a period for the athlete to recuperate from the previous season. It is also the ideal time to access the past season and programme for the one ahead. Active rest is included into the whole of the year's programme but is usually limited to 1 to 7 days.

### PREPARATION PERIOD:

In this time the athlete must put in a great deal of hard work. It is during this period that his technique must be improved or maintained, and he must achieve a high degree of body conditioning by weight training and throwing of heavy hammers.

The Preparation Period consists of General Preparation and Special Preparation Cycles. **General Preparation Exercises** consist of the general weight lifting exercises ( eg. snatch, squat and clean), sprints, standing longjump etc., while **Special Preparation Exercises** include weight exercises such as plate twists, figure "8", and Russian twists, and various delivery exercises as forward and overhead shot, throws that are standing to the left and right, and throws with 1, 2, 3 and 4 turns with heavy hammers and kettlebells.

### COMPETITION PERIOD:

Consistent technique and top results should be achieved during this period. The competition period can be divided into three segments: short early season ( interclub ), main season ( State and National Titles), and late season ( Post National Competition or an International competition).

Competitions during the short early season are not specially prepared for. They represent warm ups for later major competitions. Training is not reduced prior to these competitions.

Competitions during the main season are specially prepared for. The preparation time for a major competition is between two and four weeks, depending on the athlete. During this time the work load is decreased but the intensity is increased. There is also a two to three day period of active rest prior to the competition.

Late season competitions need to be specifically prepared for. Depending on how long after the main season they are, the athlete tries to maintain as high a level of condition as possible.

If the athlete needs to compete out of season, he needs to have a short active rest period, followed by a return to the preparation period after the main season. This is then followed by another main season period of competition.

**EXAMPLE:** the structure of a yearly training programme.

Act Rest	Preparation				Comp
	General Prepar.	Special Prepar.	General Prepar.	Special Prepar.	

### DETAIL OF CYCLES:

Each cycle for the Preparation Period lasts for two months (8 weeks) and the Competition Period/cycle approximately 3 months. The percentage of emphasis on each aspect of training is as follows:

GENERAL PREP	50% Gen.	30% Sp.	20% Tech.
SPECIAL PREP	30% Gen.	50% Sp.	20% Tech.
COMPETITION	25% Gen.	25% Sp.	50% Tech.

Each cycle is broken down into individual weeks, each week takes on the same format as the cycle being used. The week is further broken up into 14 units, each unit represents one training session, emphasising one aspect of conditioning. Four (4) sessions are devoted to Active Rest, leaving 10 actual training units per week, each of approximately 1 1/2 hours duration.

It is recommended that no two consecutive days are the same as far as possible.

**EXAMPLE:**

	MON	TUE	WED	THUR	FRI	SAT	SUN
General Preparation Cycle	Special General	Rest Rest	General General	Technical Special	General General	Rest Rest	Technical Special
Special Preparation Cycle	Special Special	Rest Rest	Special General	Technical Special	Rest General	Rest Rest	Technical Special
Competition Period	Technical General	Rest Rest	Technical General	Technical Special	General Rest	Rest or Interclub	Technical Special

When two training sessions are scheduled for the one day, they may be carried out in one long session or be split into morning and afternoon sessions.

**EXERCISE LIST:****TECHNICAL**

-multiple turns  
-throwing 5.4, 6.25  
7.26, 8kg hammers

**SPECIAL**

-throwing 9, 10, 12, 14.5 kg hammers  
-delivery with kettlebell  
-platework, twists

**GENERAL**

-all lifting  
-standing longjump  
-sprints  
-3 bounds  
-hurdle hopping

**PSYCHOLOGY IN THROWING**

When in the circle the thrower is very much alone and there are tremendous demands on the individual's concentration and strength of mind as well as body. Personality-wise there is no one type of thrower, although qualities usually include determination, perseverance, courage, self-discipline and a love of hammer throwing. Differences in personality and psychological makeup are important to the coach. Each athlete is an individual, and needs to be treated differently both in training and competition. This is something that the coach needs to work out for each athlete.

There are some common approaches that the coach can take to help the athlete in both training and competition. They are as follows:

**TRAINING** Motivation is the reason people do something, a hammer thrower must have motivation to take up the hammer and train for long periods of time, possibly for several years to reach a given standard. Motivation for the thrower varies throughout the year. Obviously the hardest period of time is going to be during the long Preparation Phase of the winter. Typical symptoms are staleness, lethargy, a tendency to skip training sessions or miss out that final set of weights because they have become bored or frustrated with the monotony, or their seemingly poor progress.

It is possible to help maintain motivation throughout these long periods of monotonous training by setting GOALS. The purpose of goals is to provide direction, provide reinforcement through feedback and provide a basis for evaluation of progress.

When setting goals:

1. Include short and long term goals
2. Goals that are measureable
3. Goals that are high, but attainable
4. Goals that are progressive
5. Goals that are recorded
6. A training diary kept for monitoring the athlete's progress

As described earlier the athlete works on a four week cycle during the Preparation Period, it is therefore logical that short term goal setting should be set for each training cycle. Assessment of these goals can be carried out at the end of each cycle and new short term goals set for the next cycle. Goal setting may take place for weight training and throwing as well as many of the other training criteria.

**COMPETITION** The coach and athlete need to develop a competition ritual that enables the athlete to perform to their maximum. The athlete needs to have a single minded outlook which can be established by three practical measures:

1. Develop a consistent pre-throw ritual. This would normally last 10-15 seconds and could consist of scraping of shoes, a focus on the throwing area, etc. The content is not important, but it needs to be consistent. This establishes a pattern which can be carried out in any circle in the world.
2. Avoid conversation with other throwers and officials during the competition (within reason).
3. Avoid observing the other throwers, as this can be a distracting influence.

To help maximise these three factors the athlete may sit slightly away from the immediate throwing area, they may put the hood up on their tracksuit, or a towel over their head, or even just close their eyes. All of these things can help to isolate the athlete from the other competitors. It is in this time that the athlete may use Visuo-Motor Behaviour Rehearsal (VMBR). VMBR requires the athlete to relax and mentally rehearse their throwing, ready for their next throwing trial. These are general guide lines and again this depends on the athlete. In some cases it is better for the athlete to keep things low key.

Lastly the **warm-up for a competition**. I strongly recommend just a gentle jog, stretch and the two given warm-up throws. This should not be new to the athlete and they should train the same way in the weeks leading up to a competition.

## TRAINING

### The Beginner Thrower

Firstly the hammers that are thrown in competition in Australia are as follows:

	Under 16	Under 18	Under 20	Open
MEN	4.00kg	5.00kg	6.00kg	7.26kg
WOMEN	3.00kg	4.00kg	4.00kg	4.00kg

The following programmes are designed with the school aged thrower in mind.

#### 12-16 YEAR OLD

During this period the general physical qualities of the athlete are developed. He learns the basics of the throw, and becomes used to regular training. The number of training days can be three to four and take in a variety of events.

The Soviets use the following guide lines for the athletes of this age group:

Hammer throws 15-20  
 Throwing the shot (various methods) 20  
 Jumps 30 take offs  
 Sprints Up to a total of 500m.

#### EXAMPLE

MON	WED	FRI
-multiple turns 5x10 -throws 15-20 x4.5kg -shot throw 20x5.4 (5 to left, 5 to right, 5 overhead, 5 forward)	-throws 15-20 x4.5kg -standing long jumps x15 -3 jumps x5 -another event	-throws 10 x5.4kg 10 x4.5kg -shot throw 20x5.4 -another event

#### 16-18 YEAR OLD

During this stage the development of the throwing technique continues, and the athlete's qualities of speed and strength are increased through the use of heavier hammers and the introduction of the basic weight lifting exercises. The weight lifting exercises are mainly used so the athlete becomes accustomed to lifting weights. At all times the correct lifting techniques are emphasised, especially in the case of the POWER SNATCH, POWER CLEAN and SQUAT. Soviet guide lines here are as follows:

Hammer throws up to 25  
 Strength work max. of 5 tonnes  
 Jumps 50  
 Throwing the shot or kettlebell 50  
 Sprints max. of 1000m

#### EXAMPLE

MON	TUE	WED
-multiple turns 5x20 -throws 10 x7.26kg 10 x 6kg -sprints	-snatch -squat -plate twist	-multiple turns 5x20 -throws 10 x6kg 10 x 5kg -sprints -jumps
THUR	FRI	SUN
-clean -figure 8 -plate twist	-throws 10 x5kg 10 x 4kg -shot 30x7.26 -sprints	-throws 10 x5kg 10 x 4kg -shot 30x7.26 -jumps

All of these programmes can be altered to suit the needs of the athlete concerned. If the athlete is physically mature the work load can be increased, like wise if the athlete is not physically mature than the work load can be reduced. At these ages the athlete should be encouraged to try several events, both to give enjoyment and to create a more athletic athlete. If the athlete wishes to try several events, he should still be encouraged to develop the correct technique for each event.

### The Senior Thrower

Bondarchuk as the Soviet National Coach stated at the World Cup in Canberra in 1985, that in his opinion, for any athlete to throw in excess of seventy metres, they would need to be a full time athlete, and at most a part time worker. There are not enough hours in the day, for a full time worker to recover adequately. The training programmes used by top level overseas throwers, can only be used as an aid in designing a programme for the Australian thrower.

Although the facilities in Australia are as good as, if not better than many overseas countries, the Australian thrower is faced with the problem of the time restrictions which are placed on such facilities. Such restrictions set the parameters for a training programme. In Australia athletes are required to carry out training in 1 session per day and a maximum of five to six days per week.

## HAMMER TRAINING PERFORMANCES

It is well known that hammer throwers need to be strong and powerful. There also exists a relationship existing between the length of a throw and the weight of the hammer used. Below is a comprehensive **guide** for the athlete and coach. Example Sedykh (86.74 m) power cleans 160 kg and standing long jumps 3.05 m, yet Tamm (84.40 m) narrow grip snatches 130 kg and standing long jumps 3.30 m. The main gauge of

ones throwing ability, is the distance achieved on the ground with the competition hammer.

This table has been extended to include women. Most of the data for both tables are based on small statistical samples. Included here is a profile of the development of Bronwyn Eagles from Australia.

### Bronwyn Eagles Profile

TESTS	1996	1997	1998	1999	2000	2001	2002	2003	2004
Age	16				20				24
Clean	62.5k	75k	92.5k	100k	105k	105k	115k	105k	107.5k
Snatch	47.5k	52.5k	60k	70k	77.5k	80k	77.5k	77.5k	77.5k
Back Squat	100k	125k	132.5k	140k	150k	155k	190k	200k	205k
Front Squat	*****	67.5k	82.5k	105kg	115k	130k	155k	170k	175k
Overhead Shot	13.75m	14.13m	15.41m	15.56m	15.42m	15.94m	16.31m	16.48m	17.05m
Fwd Shot	11.97m	12.49m	12.97m	13.50m	13.57m	14.44m	14.79m	14.78m	
30m Sprint	4.51sec	4.49sec	4.46sec	4.43sec	4.48sec	4.45sec	4.50sec	4.43sec	4.69sec
Stand long Jump	2.30m	2.39m	2.43m	2.47m	2.38m	2.53m	2.46m	2.50m	2.38m
3 Bounds	6.30m	6.40m	6.52m	6.70m	6.96m	7.00m	6.80m	7.00m	6.50m
<b>4k</b>	<b>52.08m</b>	<b>54.88m</b>	<b>59.79m</b>	<b>62.02m</b>	<b>66.55m</b>	<b>68.87m</b>	<b>69.65m</b>	<b>71.12m</b>	<b>67.92m</b>
4.6k Hammer	****	48.56m	50.84m	****	****	****			
5k 119.5cm	****	****	46.89m	49.81m	51.97m	54.74m	57.80m	59.62m	58.64m
5k S/W 90cm	****	****	****	****	****	54.77m	57.10m	58.21m	
6k s/w 90cm	****	****	****	42.20m	****	****	42.03m	51.33m	48.90m
3k 119.5cm	58.80m	60.22m	63.41m	65.15m	67.83m	75.00m	68.70m	74.00m	76.70m

70.19m in Calagary 30/7/2001 unsurveyed up-hill

## Hammer Throwing Guide Men

<b>HAMMER</b>											
<b>7.26 kg</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	<b>65</b>	<b>70</b>	<b>75</b>	<b>80</b>	<b>Sedykh</b>	<b>Rendell</b>
3.0	55.34	62.26	69.17	76.09	83.01	89.92	96.84				
4.0	52.11	58.62	65.14	71.65	78.16	84.68	91.19				104.00
5.0	48.42	54.47	60.53	66.58	72.63	78.68	84.74	90.79	96.84	100.00	
6.0	45.00	50.63	56.25	61.88	67.50	73.13	78.75	84.38	90.00	96.00	85.80
6.25	44.00	49.50	55.00	60.50	66.00	71.50	77.00	82.50	88.00		
<b>7.26</b>	<b>40.00</b>	<b>45.00</b>	<b>50.00</b>	<b>55.00</b>	<b>60.00</b>	<b>65.00</b>	<b>70.00</b>	<b>75.00</b>	<b>80.00</b>	<b>86.74</b>	<b>79.29</b>
8.0	36.20	40.73	45.25	49.78	54.30	58.83	63.35	68.50	73.00	80.46	73.10
9.0	32.22	36.25	40.28	44.31	48.33	52.36	56.50	61.00	66.00	75.50	66.20
10.0	29.00	32.63	36.25	39.88	43.50	47.13	51.50	56.00	60.00	70.20	(1.1m)
<b>LONG HEAVY</b>											
12.5kg 1.21m	23.20	26.10	29.00	31.90	35.00	37.90	40.60	44.00	48.00		
14.5kg 1.21m	20.00	22.50	25.00	28.00	31.00	34.50	38.00	40.50	43.00		
<b>SHORT HAMMERS</b>											
10.0 1m	23	29	32	36	39	42	45	49	52		54.02
12.5 1m	20	24	26	29	32	34	36	39	42		
12.5 1m2turns	18	21	24	27	30	32	34	36	38		
14.5 1m	18	21	24	27	30	32	34	36	38		
15.88 weight	13	14	15	16	17	18	19	20	21	23+	
<b>POWER RELATED</b>											
Overheadshot	10.5	12	13.5	15	16.5	18	19.5	21	22.5	18.5	21.79
3spring-jumps	7.00	7.20	7.40	7.60	7.80	8.00	8.20	8.40	8.60	9.00	
Stand LJ	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.10	3.34
30m Sprint	4.4s	4.3s	4.3s	4.2s	4.2s	4.1s	4.0s	3.9s	3.8s		**
Jump Reach	54	56	58	60	62	64	66	68	70	80	88
<b>LIFTING (kg)</b>											
Power Snatch	50	60	70	85	100	110	120	127	135	120	147.5
Power Clean	70	85	100	115	130	145	160	175	190	160	192.5
Front Squat	85	105	120	140	160	175	200	215	230		230x5
Back Squat	100	120	145	165	185	205	230	250	270	230	300x2
Deadlift	120	145	170	195	220	245	270	262	317		

\*\*Stuart ran 100m in electronic 10.81 as a 92kg 19yr old.

You will note that there is a difference between the Men's and Women's Guides. These differences occur mainly due to the physical differences of the throwers. On average the male throwers are taller than the female throwers. This translates into longer arms and longer radius, and even different angles of release.

When using the **weight lifting part of the guide**, we have found that 4-5 reps with a weight equates to a single at the next distance. Example: 5-6 Reps X 100kg Clean equates to 115kg Single equates to 55m Distance.

## Hammer Throwing Guide Women

<b>HAMMER</b>												
<b>4.0 kg</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	<b>65</b>	<b>70</b>	<b>75</b>	<b>80</b>	Kuzen -kova	Eagles
3.0	38.50	44.00	49.50	55.00	60.50	66.00	71.50	77.00	82.50	88.00		76.70
3.5	36.75	42.00	47.25	52.50	57.75	63.00	68.25	73.50	78.75	84.00		
<b>4.0</b>	<b>35.00</b>	<b>40.00</b>	<b>45.00</b>	<b>50.00</b>	<b>55.00</b>	<b>60.00</b>	<b>65.00</b>	<b>70.00</b>	<b>75.00</b>	<b>80.00</b>	<b>73.40</b>	<b>71.12</b>
4.5	32.81	37.50	42.19	46.88	51.56	56.25	60.94	65.63	70.31	75.00		
5.0	30.63	35.00	39.38	43.75	48.13	52.50	56.88	61.25	65.63	70.00		59.62
6.0	26.25	30.00	33.75	37.50	41.25	45.00	48.75	52.50	56.25	60.00		
7.26	24.00	27.00	30.00	33.00	36.00	39.00	42.00	45.00	48.00	51.00		
8.0	20.00	22.50	25.00	27.50	30.00	32.50	35.00	37.50	40.00	42.50		
<b>SHORT HAMMERS</b>												
6.0 1m												
7.26 1m												
8.0 1m												
9.08kg weight					16							
<b>POWER RELATED</b>												
Overheadshot				13.50	14.30	15.00	15.70	16.40				17.05
3spring-jumps				6.20	6.40	6.60	6.80	7.00				7.00
Stand LJ				2.30	2.35	2.40	2.45	2.50				2.53
30m Sprint				4.5				4.4				4.43
Jump Reach												
<b>LIFTING (kg)</b>												
Power Snatch	27	34	40	47	53	60	66	73	79	85	70	80
Power Clean	51	60	69	78	86	95	104	113	122	130	100	115
Front Squat	46	58	70	82	94	106	118	130	142	155		
Back Squat	64	77	90	103	116	129	142	155	168	185	150	205
Deadlift	50	60	75	90	105	121	136	151	166	185		

## Traditional Strength Levels in one table - Men's & Women's

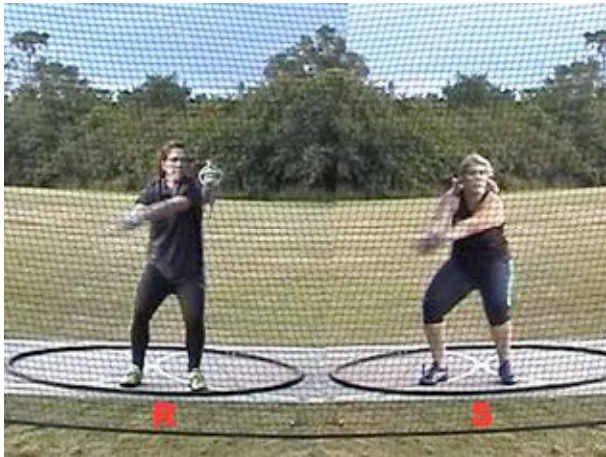
Women's calculations are based on a very small statistical sample.

<b>Men Distances</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	<b>65</b>	<b>70</b>	<b>75</b>	<b>80</b>	Bob pb	Stuart pb
Power Snatch	50	61	71	82	93	103	114	124	135	120X2	147.5
Power Clean	70	85	100	115	130	145	160	175	190	165	192.5
Front Squat	85	103	121	139	158	176	194	212	230	200	230x5
Back Squat	100	121	143	164	185	206	228	249	270	240X4	300x2
Deadlift	120	145	169	194	219	243	268	292	317	265	
<b>Women Distances</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	<b>65</b>	<b>70</b>	<b>75</b>	<b>80</b>	Olga pb	Bron pb
Power Snatch	34	40	47	53	60	66	73	79	85	70	80
Power Clean	60	69	78	86	95	104	113	122	130	100	115
Front Squat	58	70	82	94	106	118	130	142	155		175
Back Squat	77	90	103	116	129	142	155	168	185	150	205
Deadlift	60	75	90	105	121	136	151	166	185		

Included here is a modified copy of the **Zaciorskiy Table**. This table has been modified by George Dunn. It is often better to estimate 1 Repetition Max. in training rather than risk injury due to incorrect form. Example: This thrower performed 8 reps with 100kg, which equates to 130kg for 1 repetition.

<b>Revised Zaciorskiy Table By G.Dunn "The Throws Manual" 2003</b>									
<b>Weight Performed</b>	<b>Number of Repetitions</b>								
	<b>10</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>2 to 3</b>	<b>1</b>
50	71	67	65	63	59	56	53	52	50
55	79	73	71	69	65	61	58	57	55
60	86	80	78	75	71	67	63	62	60
65	93	87	84	81	76	72	68	67	65
70	100	93	91	88	82	78	74	72	70
75	107	100	97	94	88	83	79	77	75
80	114	107	104	100	94	89	84	82	80
85	121	113	110	106	100	94	89	88	85
90	129	120	117	113	106	100	95	93	90
95	136	127	123	119	112	106	100	98	95
100	143	133	130	125	118	111	105	103	100
105	150	140	136	131	124	117	111	108	105
110	157	147	143	138	129	122	116	113	110
115	164	153	149	144	135	128	121	119	115
120	171	160	156	150	141	133	126	124	120
125	179	167	162	156	147	139	132	129	125
130	186	173	169	163	153	144	137	134	130
135	193	180	175	169	159	150	142	139	135
140	200	187	182	175	165	156	147	144	140
145	207	193	188	181	171	161	153	149	145
150	214	200	195	188	176	167	158	155	150
155	221	207	201	194	182	172	163	160	155
160	229	213	208	200	188	178	168	165	160
165	236	220	214	206	194	183	174	170	165
170	243	227	221	213	200	189	179	175	170
175	250	233	227	219	206	194	184	180	175
180	257	240	234	225	212	200	189	186	180
185	264	247	240	231	218	206	195	191	185
190	271	253	247	238	224	211	200	196	190
195	279	260	253	244	229	217	205	201	195
200	286	267	260	250	235	222	211	206	200

***FIND THE ERRORS.***



01



02



03



04



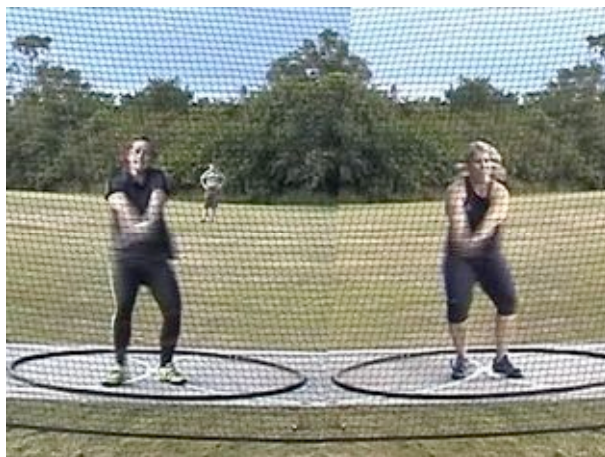
05



06



07



08



09



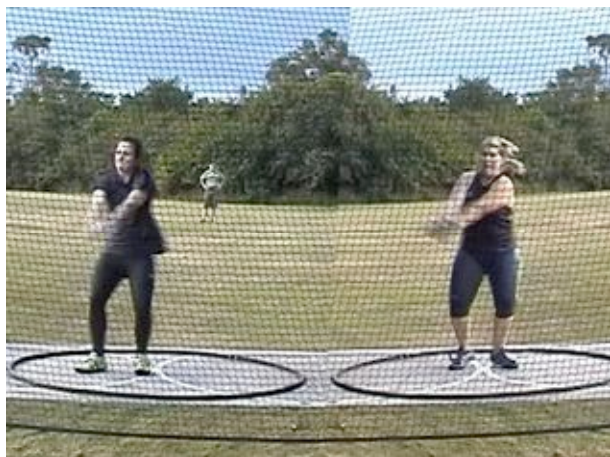
10



11



12



13



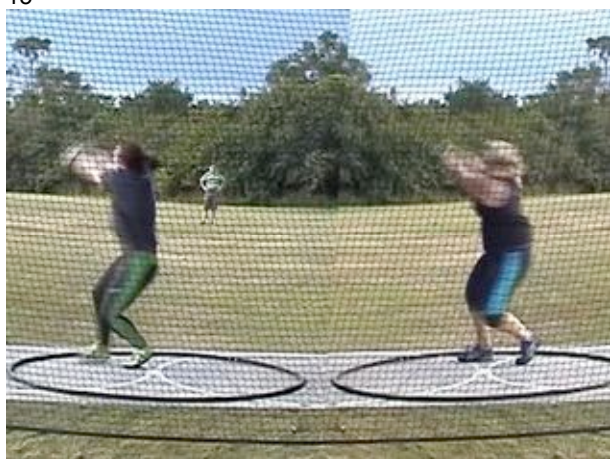
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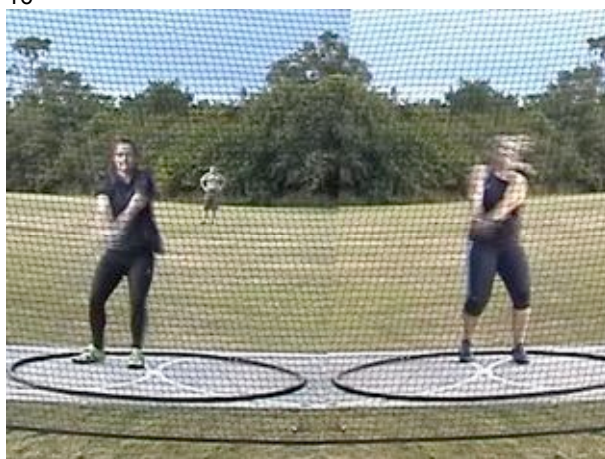
15



16



17



18



19



20

### Find the errors:

The thrower on the right of the page is actually a 4 turn left hander (Sharyn Angel), here she is throwing a 7.26kg hammer with 3 turns. I have mirrored the video. The thrower on the left (Rebecca Oakhill) is throwing a 4kg hammer. Both throwers threw approximately 40m in these throws.

It is important to note that these are still photos taken from video. They have been taken at irregular intervals so as readers there is no way to perceive the rhythm of the throw. Sharyn has been throwing for a several seasons, her left leg continually turns whereas Rebecca has only really trained for a few months, her left leg turns in a stop start fashion.

### Test yourself - Comments:

Frame 1:

Frame 11:

Frame 2:

Frame 12:

Frame 3:

Frame 13:

Frame 4:

Frame 14:

Frame 5:

Frame 15:

Frame 6:

Frame 16:

Frame 7:

Frame 17:

Frame 8:

Frame 18:

Frame 9:

Frame 19:

Frame 10:

Frame 20:

## Error Discussion.

### My Comments

Frame 1:

Both are in a good entry position with the left foot solid

Frame 2:

Both have the hammer in a good position at 90°  
Both should be looking more at the hammer  
Both have feet pointing at the hammer - good  
S looks like left shoulder leading a bit - bad

Frame 3:

R has opened up her left leg way to much. The foot will actually stop turning while everything catches up - bad  
S looks good  
Both have a good late take off of the right foot - good

Frame 4:

Both have an active right leg – good  
R's left foot hasn't moved, it is waiting  
S's left foot not active enough  
R looking at the hammer – good  
S head looking ahead of the hammer – bad

Frame 5:

S's active left leg has her plant her right foot early- good  
R's left leg has been inactive and is just starting to turn, right foot will land late - bad  
S's is looking ahead of the hammer, pulling with the left shoulder – bad  
R is looking at the hammer, upper body in an excellent position

Frame 6:

R finally plants her right foot, caused by lack of activity in the single support phase  
R hips and shoulders aligned well – good  
S appears to be about to use her left shoulder to pull the hammer around – bad  
Both have good distance between feet

Frame 7:

S is pulling with the left shoulder – bad  
R is really in a good position

Frame 8:

Both working the hammer well

Frame 9:

S is leading with her head and left shoulder - bad  
R has opened her left leg again – bad

Frame 10:

Both are in good positions, however S has an active left leg while R does not (cant been seen in a still photo)

Frame 11:

S has made contact with her right foot due to her active left leg – good  
S looking ahead of the hammer - bad  
R will have a late landing due to her inactive left leg – bad  
R has a very good triangle as she watches the hammer  
Both have fair distance between feet, would prefer the distance to reduce each turn – legs tighter turn faster

Frame 12:

Same as 11

Frame 13:

Same as 7 and 8

Frame 14:

Same as 8 and 9

Frame 15:

Same as 10

Frame 16:

Both leading a little with the head – bad  
S pulling with the left shoulder - bad

Frame 17:

Both landing early with the right foot  
Both in a very good position  
S should be looking at the hammer  
Both have fair distance between feet, from this angle however they are actually both to wide apart

Frame 18:

S has an active right leg and side, the weight has transferred back onto the left side – good  
R not working back around the left enough, the right foot and leg are not active enough - bad  
Both have worked the left leg well

Frame 19:

Both have good extension of the body and legs

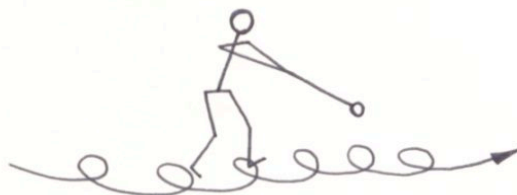
Frame 20:

Both have good extension of the body and legs

## EXERCISES

### THROWING

#### Multiple Turns



- Kettlebell - Left
- Right
- One Turn



left



right

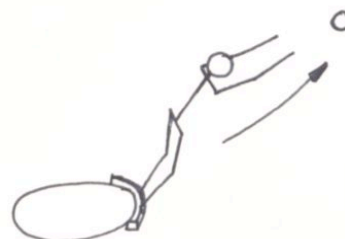
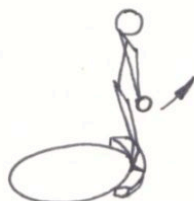


1 turn

#### Overhead Shot Throw

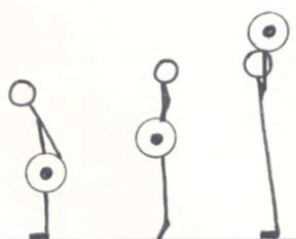


#### Forward Shot Throw

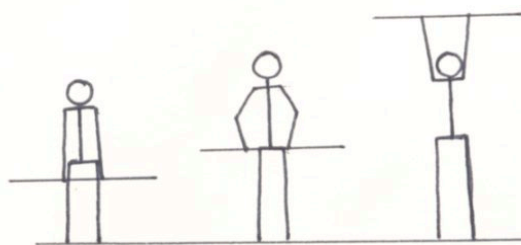


### WEIGHT LIFTING

#### Snatch - Hang

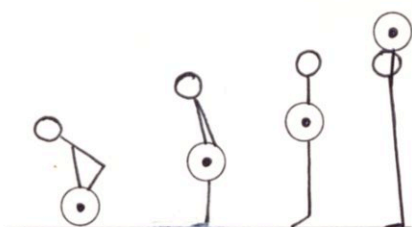


side view

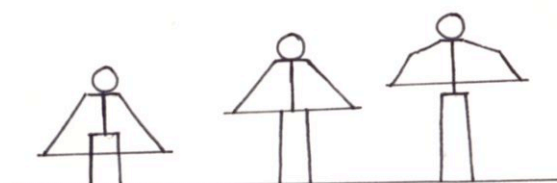
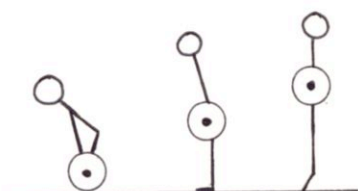


front view

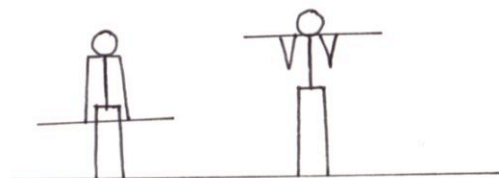
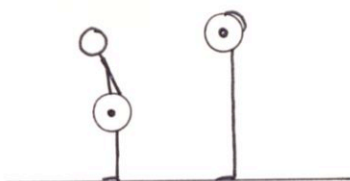
Snatch - Power



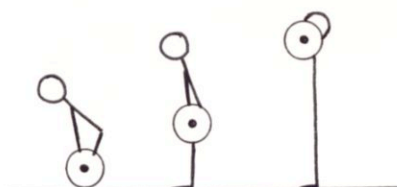
Snatch - Pull



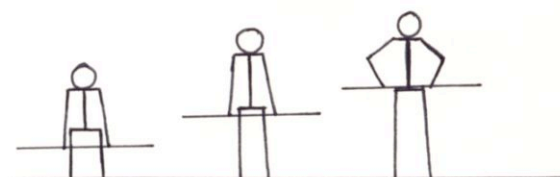
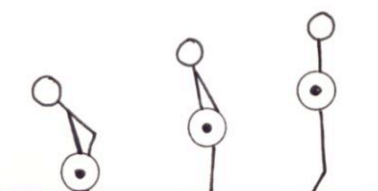
Clean - Hang



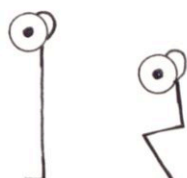
Clean - Power



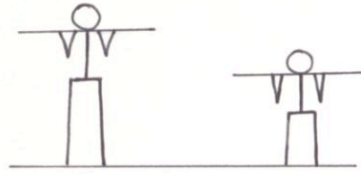
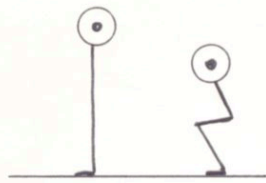
Clean - Pull



Squat - Front

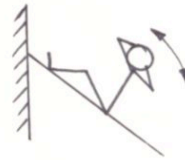
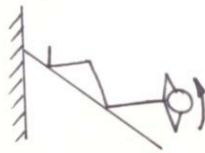


Squat - Back



SPECIAL

Incline Sit-up



Russian Twist



Plate Twist



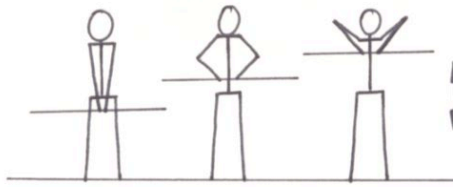
Figure of "8"



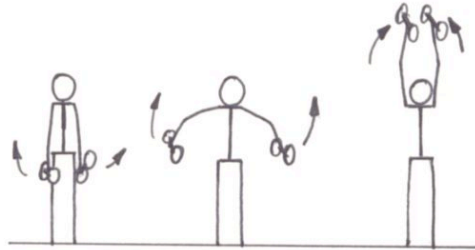
Side Bends



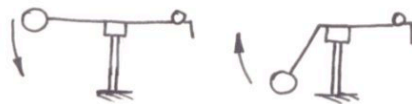
### Upright Rows



### Deltoid Side Raises



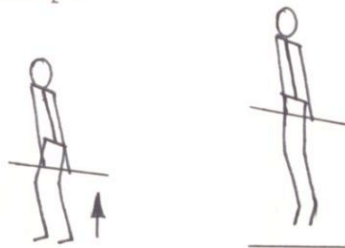
### Hyper Extensions



### Calf Raises



### Weighted Jumps



### 30 Metre Sprint



30 m →



## BOUNDING

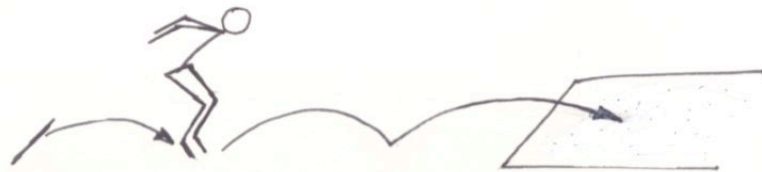
Stairs - 2 Legs

- Right Leg

- Left Leg



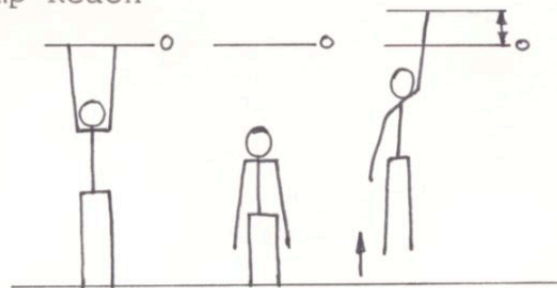
3 Spring Jumps



Standing Long Jump



Jump Reach



Hurdles



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Ian Ison 1985

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