

PROGRESSION OVERVIEW

MEN		60 to 70	70 to 80	80 to 90	90 to 20	60 to 20
American Record Prog	SCY	7.40%	4.81%	2.67%	1.25%	8.51%
American Record Prog	LCM	6.36%	4.73%	2.23%	1.03%	7.45%
World Record Prog	LCM	7.11%	4.62%	2.03%	1.51%	7.87%

WOMEN		60 to 70	70 to 80	80 to 90	90 to 20	60 to 20
American Record Prog	SCY	7.89%	6.94%	1.41%	1.19%	9.35%
American Record Prog	LCM	7.28%	6.61%	1.48%	1.07%	8.76%
World Record Prog	LCM	7.00%	7.24%	1.37%	1.31%	9.38%

WOMENS FREESTYLE SEQUENCES

(x) NON SWIM TIME

100 SCY Serial	8.85	(4.21)	8.85
200 SCY Serial	10.15	(3.59)	10.15
100 LCM Cyclical	24.62	(6.05)	24.62
200 LCM Cyclical	26.65	(4.18)	26.65

MENS FREESTYLE SEQUENCES

(x) NON SWIM TIME

100 SCY Serial	8.00	(3.68)	8.00
200 SCY Serial	8.9	(3.57)	8.9

100 LCM Cyclical	22.92	(6.09)	22.92
200 LCM Cyclical	24.02	(4.01)	24.02

EVENT SET PIECES

FREESTYLE SWIM LENGTH

- In order: (1) wall press, (2) wall flight,
(3) subsurface travel, (4) exit, (5) swim,
(6) wall prep, (7) rotation, (8) wall plant

SERIAL SWIMMING ACTIVITY

- Short course activity patterns are **serial** in nature; a series of multiple neural sequences is continually repeated

SERIAL SHORT COURSE FREESTYLE

- **Non-swim** set pieces
 - 3.5 – 5 sec
- **Swim** set piece
 - 8 – 10.5 sec

200 SWIM SHORT COURSE

- Dive length not included
- Number of **serial set pieces**
 - Non-swim: 49
 - Swim: 7

CYCLICAL SWIMMING ACTIVITY

- Long course activity patterns are **cyclical** in nature; a singular neural sequence is drawn out and infrequently interrupted.

CYCLICAL LONG COURSE FREESTYLE

– **Non-swim** set pieces

–4 – 6.5 sec

- **Swim** set piece
 - 23 – 27 sec

200 SWIM LONG COURSE

- Dive length not included
- Number of **cyclical set pieces**
 - Non-swim: 21
 - Swim: 3

Women's Ave. Periodic Swim Time: 100 Events

	Fly	Back	Breast	Free
SCY	7.79	7.83	10.15	8.85
LCM	25.44	25.69	29.54	24.62

Women's Ave. Periodic Swim Time: 200 Events

	Fly	Back	Breast	Free
SCY	10.4	9.20	10.91	10.15
LCM	28.2	28.71	31.44	26.65

WOMENS PERIODIC SWIM TIME RANGES

	100's	200's
SCY	7 – 9 sec	9 - 11 sec
LCM	24 - 30 sec	26 – 32 sec

Men's Ave. Periodic Swim Time: 100 Events

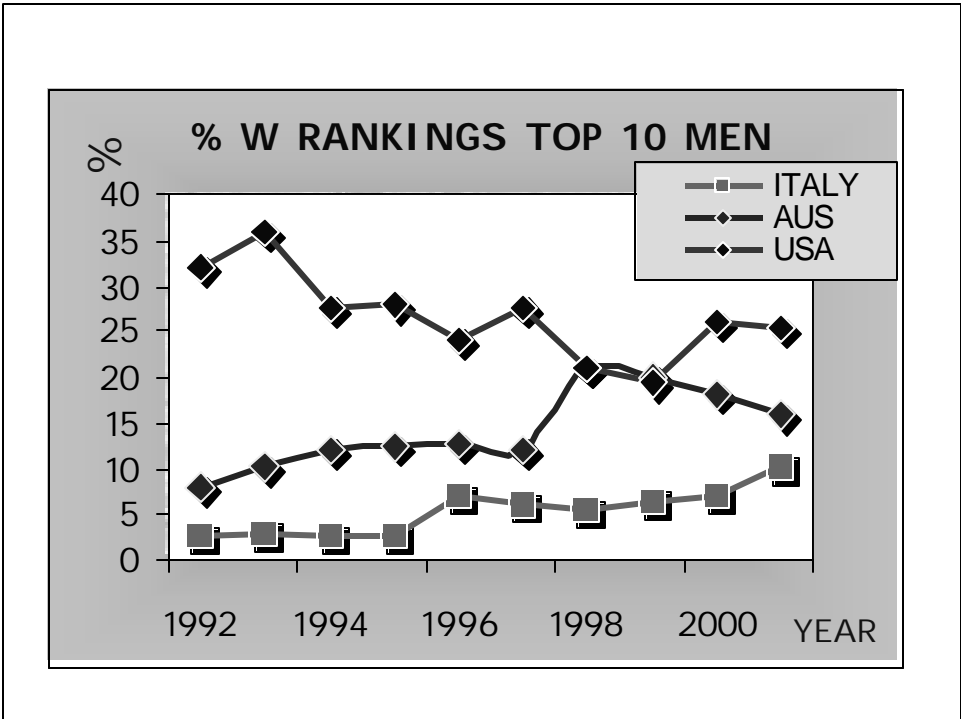
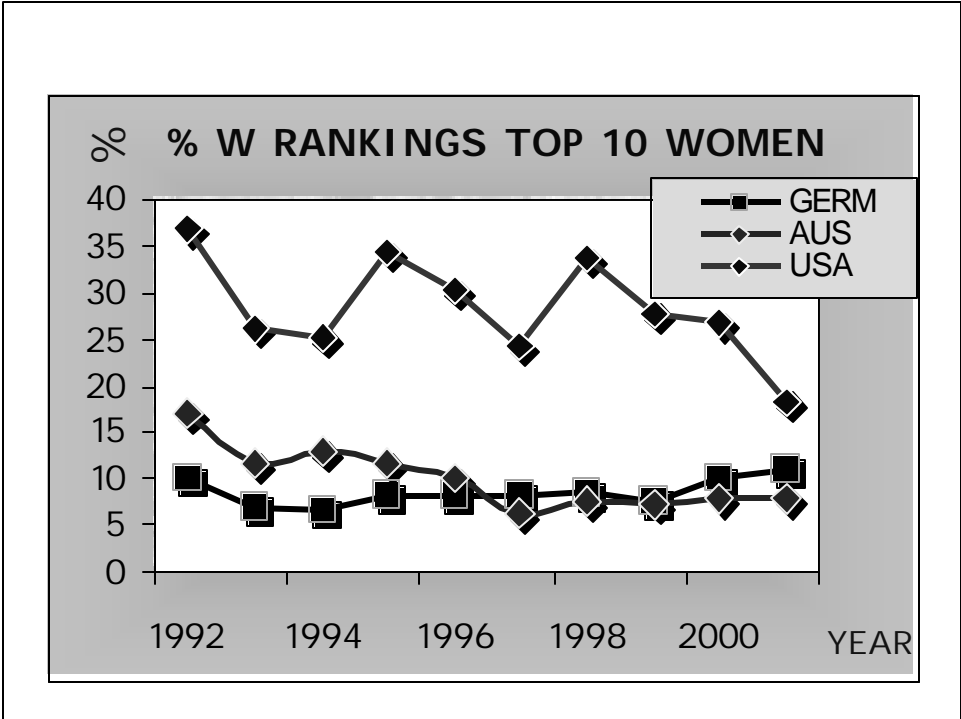
	Fly	Back	Breast	Free
SCY	6.53	5.03	8.71	8.00
LCM	21.74	21.76	25.76	22.92

Men's Ave. Periodic Swim Time: 200 Events

	Fly	Back	Breast	Free
SCY	8.8	7.07	9.28	10.12
LCM	25.2	24.84	27.88	24.02

MENS PERIODIC SWIM TIME RANGES

	100's	200's
SCY	5 – 9 sec	7 – 10 sec
LCM	22 – 26 sec	22 – 28 sec



CYCLICAL versus SERIAL SWIMMING

OVERALL BREAKDOWN

AVERAGES WOMEN		tot u/w time	tot turn time	actual swim time
50 FR	SCY	4.83	0.95	16.21
	SCM	5.00	0.87	18.81
	LCM	3.01	0.00	22.09
	DIF	-1.82	-0.95	5.88
100 FR	SCY	9.13	3.49	35.39
	SCM	8.86	3.46	41.25
	LCM	4.91	1.14	49.24
	DIF	-4.22	-2.36	13.84
200 FR	SCY	16.40	8.69	81.15
	SCM	17.90	8.55	90.10
	LCM	8.95	3.59	106.60
	DIF	-7.45	-5.10	25.45

OVERALL BREAKDOWN

AVERAGES MEN		tot u/w time	tot turn time	actual swim time
50 FR	SCY	4.33	1.02	14.27
	SCM	4.78	0.92	15.92
	LCM	2.66	0.00	19.64
	DIFF	-1.67	-1.02	5.37
100 FR	SCY	7.87	3.16	31.99
	SCM	8.56	3.31	35.87
	LCM	4.97	1.15	42.92
	DIFF	-2.90	-2.01	10.93
200 FR	SCY	16.50	8.47	70.81
	SCM	16.93	8.06	81.18
	LCM	8.35	3.66	96.06
	DIFF	-8.15	-4.81	25.25

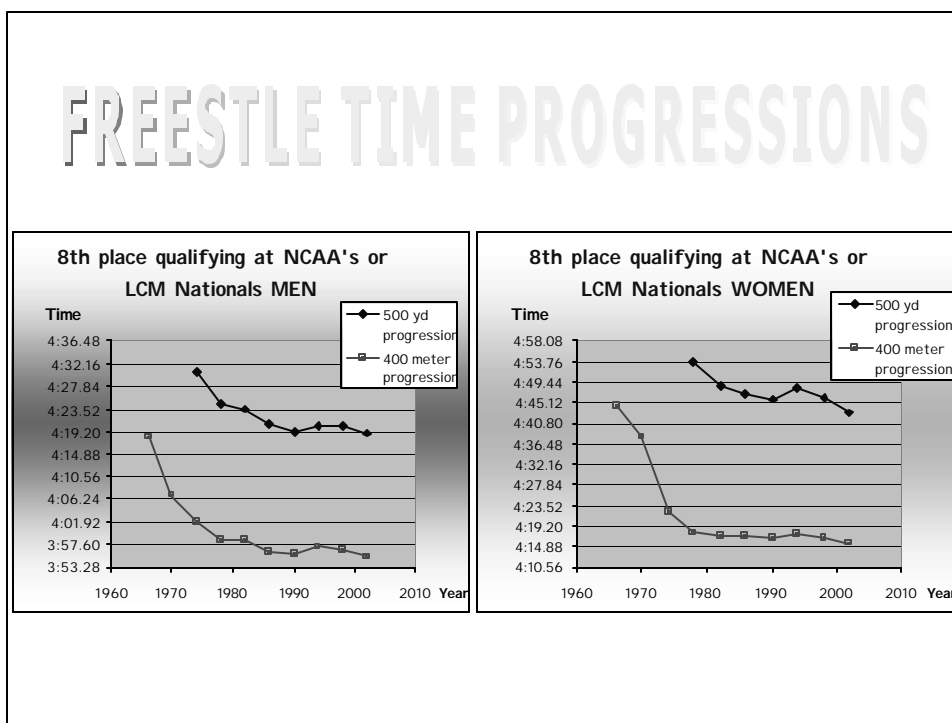
STROKE DESIGN & TRAINING ISSUES

FREESTYLE TIME PROGRESSIONS

A COMPARISON BETWEEN
THE 500 YD FREE PROGRESSION AND THE 400 METER FREE PROGRESSION

	WOMEN				MEN			
	NCAA'S		SUMMER NATS		NCAA'S		SUMMER NATS	
	prelim seed		prelim seed		prelim seed		prelim seed	
	1st	8th	1st	8th	1st	8th	1st	8th
1966			4:41.50	4:44.60			4:11.80	4:18.20
1970			4:30.36	4:37.92			4:05.07	4:07.11
1974			4:17.92	4:22.23	4:27.23	4:30.78	3:56.96	4:01.87
1978	4:49.40	4:53.45	4:10.70	4:17.62	4:21.19	4:24.44	3:53.66	3:58.58
1982	4:44.84	4:48.64	4:11.82	4:16.80	4:20.55	4:23.34	3:54.07	3:58.65
1986	4:43.17	4:47.05	4:11.18	4:17.15	4:18.01	4:20.50	3:51.35	3:56.24
1990	4:39.03	4:45.82	4:12.68	4:16.77	4:15.96	4:19.10	3:51.85	3:55.59
1994	4:43.31	4:48.18	4:13.46	4:17.58	4:12.44	4:20.42	3:54.43	3:57.07
1998	4:39.97	4:46.06	4:12.69	4:16.54	4:18.25	4:20.20	3:52.49	3:56.47
2002	4:41.35	4:42.99	4:09.81	4:15.73	4:16.12	4:18.76	3:52.62	3:55.20

1974 The lycra suit was introduced to swimming
 1978 The results for the 500 yd free were taken from the 1979 AI AW Nationals since the 1978 AI AW results were very sparse
 2000 The full body suit had been introduced by 2000

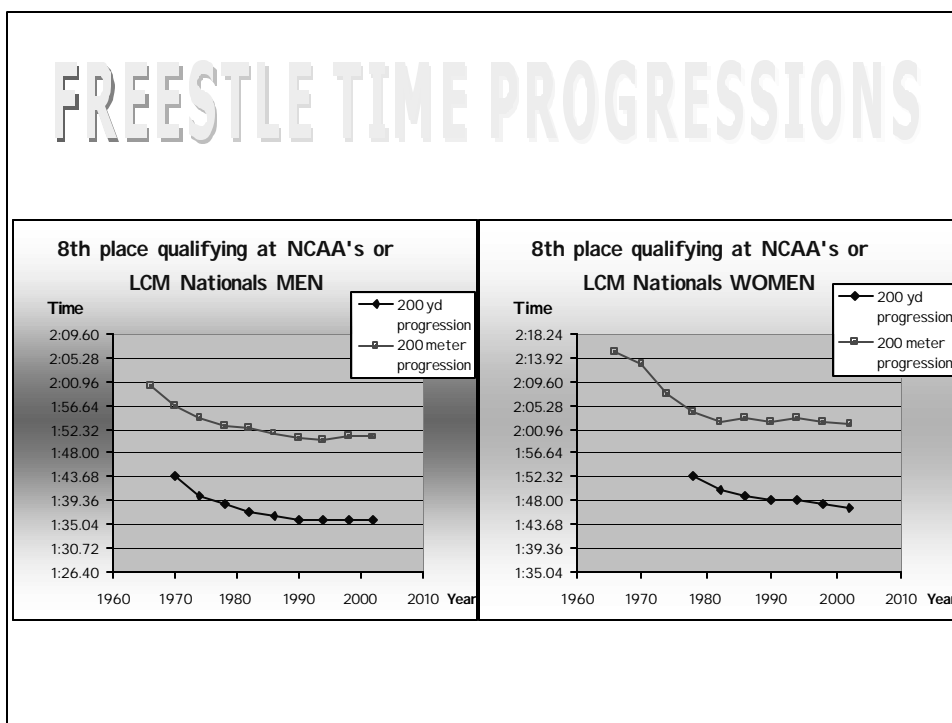


FREESTYLE TIME PROGRESSIONS

A COMPARISON BETWEEN
THE 200 YD AND THE 200 METER FREE PROGRESSION

	WOMEN				MEN			
	NCAA'S		SUMMER NATS		NCAA'S		SUMMER NATS	
	prelim seed		prelim seed		prelim seed		prelim seed	
	1st	8th	1st	8th	1st	8th	1st	8th
1966			2:12.30	2:15.00			1:58.00	2:00.50
1970			2:11.49	2:12.88	1:43.37	1:43.94	1:55.28	1:56.77
1974			2:04.59	2:07.52	1:39.39	1:40.39	1:52.88	1:54.61
1978	1:48.32	1:52.35	2:00.45	2:04.32	1:36.77	1:38.81	1:52.17	1:53.03
1982	1:47.40	1:50.05	2:00.36	2:02.53	1:36.60	1:37.28	1:49.84	1:52.67
1986	1:46.88	1:48.84	1:59.79	2:03.02	1:35.57	1:36.72	1:49.94	1:51.65
1990	1:46.16	1:48.23	2:00.98	2:02.28	1:34.21	1:35.71	1:48.52	1:50.69
1994	1:46.53	1:48.31	2:01.20	2:02.93	1:35.06	1:36.06	1:49.22	1:50.52
1998	1:45.91	1:47.50	2:00.35	2:02.50	1:35.09	1:35.94	1:48.91	1:51.15
2002	1:45.97	1:46.56	1:59.77	2:01.99	1:35.30	1:36.16	1:48.94	1:50.93

1974 The lycra suit was introduced to swimming
 1978 The results for the 500 yd free were taken from the 1979 AIAW Nationals since the 1978 AIAW results were very sparse
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WHAT DOES THIS SUGGEST?

- Training Philosophy
- Conceptual Errors
- Stroke Design Problems

TRAINING PHILOSOPHY

- Longest running real life experiment in the history of sport
- Thirty years of workout design adjustments looking for the Holy Grail training design
- Think of the enormity of the focus; scientific investigation, peer conversations, books and publications, clinic presentations; all world-wide
- Yesterday's swimmers are today's coaches

CONCEPTUAL ERRORS

- Velocity without management considerations
- Impulse quality as key to velocity
- Extremity propulsion
- Low-side impulse generation
- Open vs. closed hose physiology

STROKE DESIGN ISSUES

- Linear vs. curvilinear concept
- Environmental leverage choices
- Axial structural integrity
- Fade / deceleration in long course
- Extremity point source force plates

FREESTYLE VARIATIONS

- Straight arm slight body roll that is power based in the back quadrant (50, 100)
- High elbow high body roll that is power based in the front quadrant of the stroke (100 , 1500)
- High elbow slight body roll that is power based in the mid quadrant (200, 1500)



IMAGE - 2
•POWER BASED
• MAX NEURAL
• HIGH FATIGUE
• SHOULDER BASED
POWER



IMAGE - 4
•ENDURANCE BASED
• SELECTIVE NEURAL
• LOW FATIGUE
• BODY BASED POWER

POSSIBLE FREESTYLE SOLUTIONS

- Axial / appendicular structural design that can withstand the physical stress created while operating at extreme aquatic velocities
- Axial / appendicular movement patterns that are sustainable over the duration of the stress

POSSIBLE FREESTYLE SOLUTIONS

- Honoring both the impulse and space segments of our aquatic bipedal velocity; particularly the space which plays a critical role in both external and internal efficiency
- Accept the fact that aquatic management qualities generate velocity possibilities or give it limits