

**An Analysis of the Career
Of
Roger Clemens**

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Introduction

This report will evaluate the career of Roger Clemens, one of the most successful pitchers in major league history. It will examine both the quality and quantity of his pitching over the course of his 24-year career. As of the 2007 season, Clemens was one of twenty-eight active major league players who were at least 40 years old. Of those twenty-eight, eighteen were pitchers, and twelve of those were starting pitchers.

This report will show:

- Starting pitchers, like all major league baseball players, undergo highs and lows over the course of their careers. One simply does not find straight trend lines in performance in major league baseball. A baseball career mimics life, in that there are good days and bad days, hot streaks and cold spells, as well as good years and bad years. A wide variety of factors determine the success of a player, including the player's health, the quality of his team, and the pitcher or hitter he happens to be facing in a particular at bat. Roger Clemens' baseball career is no exception.
- Featuring a dominating fastball as a young pitcher, Clemens' longevity was due to his ability to adjust his style of pitching as he got older, incorporating his very effective split-finger fastball to offset the decrease in the speed of his regular fastball caused by aging.
- The peak of Clemens' career began in August of 1996 with the Boston Red Sox and extended to the beginning of 1999 with the New York Yankees. During this period, covering all or part of four seasons, Clemens posted numerous personal highs, including a 20-strikeout game and two pitching "triple crowns".
- An analysis of Clemens' ability to strike out opposing batters over the course of his career shows that Clemens' strikeout patterns closely resemble the trends of other notable strikeout pitchers
- While Clemens pitched at a high level of quality at different points throughout his career, the quantity of his pitching declined as he reached his late 30's and 40's.

A brief summary of Roger Clemens' career

Over the course of his 24-year major league pitching career, Roger Clemens amassed a 354-184 won-lost record and won 7 Cy Young Awards. Clemens won the championship game of the 1983 NCAA National Baseball Championship for the University of Texas. He was drafted in the first round by the Boston Red Sox in 1983. Rising rapidly through the minor leagues, he made his major league debut with the Red Sox on May 15, 1984. Except for one game pitched out of the bullpen, Clemens remained in the Boston starting rotation until shoulder problems required surgery in 1985. His surgery was performed by renowned orthopedic surgeon Dr. James Andrews. This surgery, coming so early in his career, caused Clemens to focus on a workout routine designed to prevent arm and shoulder injuries.

Clemens' comeback from surgery in 1986 could hardly have been more successful. Pitching a full season in the major leagues for the first time in 1986, Clemens won his first Cy Young Award and the American League Most Valuable Player award, as well being named the Most Valuable Player of the 1986 All-Star Game. Over the next 10 years with the Red Sox, Clemens would establish himself as a Hall-of-Fame caliber pitcher.

Clemens pitched through the 1996 season with Boston, tying the legendary Cy Young with 192 victories in a Red Sox uniform. He pitched two very successful seasons with the Toronto Blue Jays in 1997 and 1998 before being traded to the New York Yankees, where he played from

1999 through 2003. During this period, the Yankees would appear in the World Series four times, and Clemens would contribute to their two World Series Championships.

Clemens briefly retired after the 2003 season before deciding to return to baseball with the Houston Astros in 2004. Pitching for the first time in the National League, Clemens won his 7th Cy Young Award in 2004. He followed it with the best ERA for a starting pitcher in the major leagues in 2005, when he helped the Astros get to their first World Series appearance. He would pitch a partial season for Houston in 2006 before returning to the New York Yankees in June of 2007 for another partial season.

The following chart shows the season-by-season statistics for Roger Clemens over the course of his career. Notable awards as well as seasons in which he was injured are noted in the Awards/Comments column.

Chart 1
Career Performance Record of Roger Clemens: 1984-2007

Year	Club	G	GS	IP	H	BB	SO	W	L	Pct.	ERA	Awards/Comments
1984	Bos	21	20	133.1	146	29	126	9	4	.692	4.32	Major League debut on May 15
1985	Bos	15	15	98.1	83	37	74	7	5	.583	3.29	disabled
1986	Bos	33	33	254.0	179	67	238	24	4	.857	2.48	MVP, Cy Young, All-Star
1987	Bos	36	36	281.2	248	83	256	20	9	.690	2.97	Cy Young
1988	Bos	35	35	264.0	217	62	291	18	12	.600	2.93	All-Star
1989	Bos	35	35	253.1	215	93	230	17	11	.607	3.13	
1990	Bos	31	31	228.1	193	54	209	21	6	.778	1.93	All-Star
1991	Bos	35	35	271.1	219	65	241	18	10	.643	2.62	Cy Young, All-Star
1992	Bos	32	32	246.2	203	62	208	18	11	.621	2.41	All-Star
1993	Bos	29	29	191.2	175	67	160	11	14	.440	4.46	disabled
1994 ¹	Bos	24	24	170.2	124	71	168	9	7	.563	2.85	
1995 ²	Bos	23	23	140.0	141	60	132	10	5	.667	4.18	disabled
1996	Bos	34	34	242.2	216	106	257	10	13	.435	3.63	
1997	Tor	34	34	264.0	204	68	292	21	7	.750	2.05	Cy Young, All-Star
1998	Tor	33	33	234.2	169	88	271	20	6	.769	2.65	Cy Young, All-Star
1999	NYY	30	30	187.2	185	90	163	14	10	.583	4.60	disabled
2000	NYY	32	32	204.1	184	84	188	13	8	.619	3.70	disabled
2001	NYY	33	33	220.1	205	72	213	20	3	.870	3.51	Cy Young, All-Star
2002	NYY	29	29	180.0	172	63	192	13	6	.684	4.35	disabled
2003	NYY	33	33	211.2	199	58	190	17	9	.654	3.91	All-Star
2004	Hou	33	33	214.1	169	79	218	18	4	.818	2.98	Cy Young, All-Star
2005	Hou	32	32	211.1	151	62	185	13	8	.619	1.87	All-Star
2006 ³	Hou	19	19	113.1	89	29	102	7	6	.538	2.30	Partial season
2007 ⁴	NYY	18	17	99.0	99	31	68	6	6	.500	4.18	Partial season
Totals		709	707	4916.2	4185	1580	4672	354	184	.658	3.12	1 MVP, 7 Cy Young, 11 All-Star

¹ MLB work stoppage eliminated 50 games, or 31% of the season, from Boston's schedule.

² MLB work stoppage eliminated 18 games, or 11% of the season, from Boston's schedule.

³ Clemens began the season, by contract, in June. In 2006, he was on the roster for 56% of the season.

⁴ Clemens began the season, by contract, in June. In 2007, he was on the roster for 63% of the season.

Key

G – games pitched. **GS** – games started. **W** – wins. **L** – losses.
Pct. – percentage of decisions won. **ERA** – earned run average.

During his career Roger Clemens appeared in 709 regular-season games, all but two of which were in a starting role, and pitched a total of 4916.2 innings. His career won-lost record is 354-184, giving him a winning percentage of .658. Clemens' career earned run average, or ERA, is 3.12.

The awards and comments box that is displayed to the right of the statistical chart shows that Roger Clemens has received 19 significant honors, 16 in the American League and 3 in the National League. The box also reveals that he was on the official disabled list for some period of time in six seasons and that he played for shortened seasons in 2006 and 2007 by contractual agreements with the Astros and the Yankees. In the 12 years in which he did not win an award, he was a rookie in one season, played a partial season due to a work stoppage in one season, was on the disabled list for part of the season in six seasons, and was under contract for only a partial season of play in two seasons. In only three years, 1989, 1994, and 1996, was Clemens healthy and on a major league roster for the entire season without earning a significant pitching award.

I. Pitching Quality

This section will examine the quality of Roger Clemens' pitching over the course of his career. By examining his ERA and comparing it to the league average ERA, it is possible to analyze Roger Clemens' individual performance against the individual performance of other pitchers. This is a better way of determining how well a pitcher performs than is his won-lost record, because a won-lost record is more heavily dependent on how well the team around the pitcher performs.

The statistics in this section show that Clemens pitched extremely well some years, while in other seasons he was less effective. Similarly, there are some months in which he pitched extremely well and others in which he did not.

The 1996 season was the start of the best pitching span of his major league career, which continued into the 1999 season.

A comparison of Clemens' strikeout rates to those of other power pitchers with long careers shows that these pitchers had some of their best qualitative performances later in their careers.

A. ERA and League ERA Margin: Accurate and Reliable Measures of Pitching Quality

The central goal of every pitcher is to prevent the opposing team from scoring runs. Consequently, the most important basic measure of the quality of a starting pitcher is his earned run average (ERA) because it provides an accounting of his ability to prevent runs. ERA is calculated by dividing the total number of earned runs allowed by a pitcher by the number of innings he pitched, then multiplying that result by nine, to show how many earned runs he would give up over the course of a full nine inning game. A pitcher's ERA does not penalize a pitcher for unearned runs (typically the result of a fielding error by a player other than the pitcher), so it is a good measure of a pitcher's individual performance.

In modern statistical analysis, a starting pitcher's ERA is considered a better measure of his effectiveness than is his won-lost record, because wins and losses are heavily dependent upon factors outside the pitcher's control. A pitcher's won-lost record is affected not only by how well the pitcher performs but also by the levels of support that he receives from the hitters and relief pitchers on his team. (As shown in subsequent exhibits, many of the year-to-year won-lost records of Clemens have indeed been affected by the support provided by his teammates.) For this reason, the won-lost record is a product of all three of the basic elements of baseball:

pitching, hitting, and fielding. While a win or a loss in a given game is typically more dependent upon the performance of the starting pitcher than that of any other player, due to the fact that he usually pitches the most innings, it is better understood as a measure of overall team performance. By contrast, a pitcher's ERA is based much more on the pitcher's individual performance.

While ERA is generally a good measure of a starting pitcher's individual performance, it is affected by two important external elements of play, namely the league in which he plays and the home stadium in which he performs. Since the introduction of the designated hitter rule in the American League (A.L.) in 1973, which substitutes a hitter for the pitcher in the batting order, run production has naturally been higher in the A.L. than in the National League (N.L.). In fact, the N.L. ERA has been lower in each and every year since 1973. This gives N.L. pitchers a systemic advantage over their A.L. counterparts in raw ERA. A simple way of correcting for this advantage when comparing the ERAs of pitchers from different leagues is to determine the difference between the N.L. and A.L. ERAs and deduct that difference from all A.L. pitchers' ERA.

The differences between players' home stadiums are generally far smaller in magnitude than the league variations. There are, however, exceptions. For the first several years of play in Colorado, the effect of the Rockies' ballpark on run production was the most inflated in post-1900 baseball history. At the other end of the spectrum was the Houston Astrodome, where run production was at historical lows for most of the 35 years that it was home to the Astros. Roger Clemens pitched for the Boston Red Sox for the first 13 years of his career, pitching roughly half of his games in hitter-friendly Fenway Park. Over his career, his home parks have negatively affected his ERA by a net total of 2%.

ERA by itself is not able to predict wins and losses for a pitcher. For example, ERA does not reflect year-to-year changes in offensive run support by a starting pitcher's club, or how a pitcher performs compared to other pitchers. In 1988, Clemens had a 2.93 ERA with an 18-12 won-lost record, a .600 winning percentage. In 2000, he had a 3.78 ERA with a 13-8 record, a .619 winning percentage. One would expect a 2.93 ERA to produce a far higher winning percentage than a 3.78 ERA. It so happens, however, that the American League ERA in 1988 was 3.97, while the 2000 ERA was 4.91, nearly a full run higher. Therefore, in relative terms, Clemens outperformed the league average by a margin of 0.85 runs in 1988 and by 1.13 runs in 2000. Thus, it is not surprising that he had a slightly better winning percentage in 2000. (Chart Nos. 11 & 12, which appear on page 12, show that he received roughly average run support in both seasons, thereby removing that element as a meaningful factor in this comparison.)

ERA Margin is a sound and reliable measure of the quality of a starting pitcher's performance. ERA Margin is the difference by which a pitcher's ERA has exceeded or fallen short of his league's ERA. This enables one to compare pitchers across the two major leagues on essentially the same scale. A more pure statistical approach to calculating ERA Margin would be to apply percentage differences and to then recalculate the figures on that basis. But the raw differences are more accessible, easier to calculate, and more readily understood; and, the results are not substantially different.

In the chart that follows, the ERA Margins for Roger Clemens are displayed in the "Margins" column. They range from -0.33 runs in Clemens' 1984 rookie season to +2.52 runs in 1997, his best overall season in terms of performance quality and quantity. The chart shows that Clemens had a sub par ERA in just one other year, 1993.

Chart 2
Career Performance Record of Roger Clemens: 1984-2007

Year	Club	G	GS	IP	W	L	Pct.	ERA	Margin
1984	Bos	21	20	133.1	9	4	.692	4.32	-0.33
1985	Bos	15	15	98.1	7	5	.583	3.29	+0.86
1986	Bos	33	33	254.0	24	4	.857	2.48	+1.70
1987	Bos	36	36	281.2	20	9	.690	2.97	+1.49
1988	Bos	35	35	264.0	18	12	.600	2.93	+1.04
1989	Bos	35	35	253.1	17	11	.607	3.13	+0.76
1990	Bos	31	31	228.1	21	6	.778	1.93	+1.98
1991	Bos	35	35	271.1	18	10	.643	2.62	+1.48
1992	Bos	32	32	246.2	18	11	.621	2.41	+1.53
1993	Bos	29	29	191.2	11	14	.440	4.46	-0.13
1994 ¹	Bos	24	24	170.2	9	7	.563	2.85	+1.95
1995 ²	Bos	23	23	140.0	10	5	.667	4.18	+0.54
1996	Bos	34	34	242.2	10	13	.435	3.63	+1.37
1997	Tor	34	34	264.0	21	7	.750	2.05	+2.52
1998	Tor	33	33	234.2	20	6	.769	2.65	+2.00
1999	NYY	30	30	187.2	14	10	.583	4.60	+0.26
2000	NYY	32	32	204.1	13	8	.619	3.70	+1.21
2001	NYY	33	33	220.1	20	3	.870	3.51	+0.96
2002	NYY	29	29	180.0	13	6	.684	4.35	+0.11
2003	NYY	33	33	211.2	17	9	.654	3.91	+0.61
2004	Hou	33	33	214.1	18	4	.818	2.98	+1.32
2005	Hou	32	32	211.1	13	8	.619	1.87	+2.35
2006 ³	Hou	19	19	113.1	7	6	.538	2.30	+2.19
2007 ³	NYY	18	17	99.0	6	6	.500	4.18	+0.33
Totals		709	707	4916.2	354	184	.658	3.12	+1.25

Margin = League ERA minus pitcher's ERA.

¹ MLB work stoppage eliminated 50 games, or 31% of the season, from Boston's schedule.

² MLB work stoppage eliminated 18 games, or 11% of the season, from Boston's schedule.

³ Clemens began the season, by contract, in June. In 2006, he was on the roster for 56% of the season.

⁴ Clemens began the season, by contract, in June. In 2007, he was on the roster for 63% of the season.

Clemens' Levels of Performance

Using ERA Margins, Clemens' 24 seasons are divided into six qualitative subgroups that are designated by tiers in the column headings in the following chart:

**Chart 3
Roger Clemens: Breakdown of Seasonal ERA Margins**

Tier 1	Year	Tier 2	Year	Tier 3	Year	Tier 4	Year	Tier 5	Year	Tier 6	Year	
-0.33	1984	+0.54	1995	+0.96	2001	+1.37	1996	+1.95	1994	+2.35	2005	
-0.13	1993	+0.61	2003	+1.04	1988	+1.48	1991	+1.98	1990	+2.52	1997	
+0.11	2002	+0.76	1989	+1.21	2000	+1.49	1987	+2.00	1998			
+0.26	1999	+0.86	1985	+1.32	2004	+1.53	1992	+2.19	2006			
+0.33	2007					+1.70	1986					
Avg	+0.05	5 yrs	+0.69	4 yrs	+1.13	4 yrs	+1.51	5 yrs	+2.03	4 yrs	+2.44	2 yrs

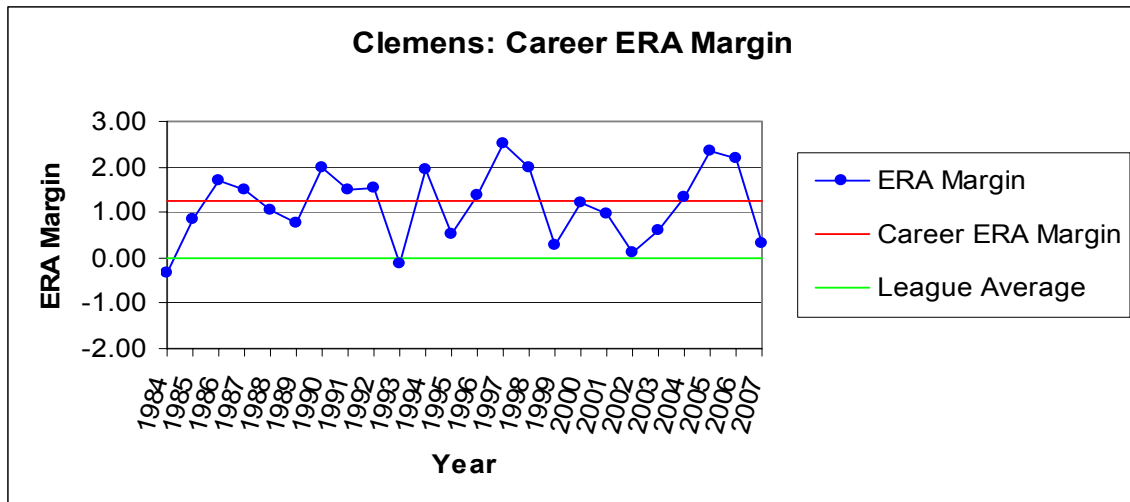
Blue highlight – rookie season.

Red highlights – on the disabled list for some period.

Tier 1: up to +0.45; Tier 2: +0.46 to +0.90; Tier 3: +0.91 to +1.35;
Tier 4: +1.36 to +1.80; Tier 5: +1.81 to +2.25; Tier 6: +2.26 to +2.70

The chart reveals that Roger Clemens has performed in the average-to-good range for 9 years (Tiers 1 and 2), at a superior level for 9 years (Tiers 3 and 4), and at the highest levels for 6 years (Tiers 5 and 6). The fact that his different levels of performance are distributed more or less randomly throughout the 24 years in which Clemens has pitched indicates that he has experienced the largely unpredictable ups and downs that all long-term major league pitchers endure in their careers. The graph below helps illustrate the year-to-year variation in Clemens' ERA Margin in relation to his career average.

Chart 4



One simply does not find straight trend lines in performance in major league baseball. A baseball career mimics life, in that there are good days and bad days, hot streaks and cold spells, as well as good years and bad years, both within and across seasons. A wide variety of factors determine the success of a player, including the player's health, the quality of his team, and the pitcher or hitter he happens to be facing in a particular at bat. As the chart and graph above demonstrate, Roger Clemens' baseball career is no exception.

Clemens' best years, shown in the last two tiers of the chart above, occurred at different periods over the course of his career. Of the six years that feature Clemens' best ERA Margins, two occurred in Boston, after he had been in the major leagues for several years; two occurred in his

two years in Toronto; and two occurred after he switched leagues and pitched for the Houston Astros.

Clemens was effective throughout his career because he adapted his style of pitching to his physical abilities as he aged. In his younger years, Clemens threw an overpowering fastball in the range of 96 m.p.h. He accompanied the fastball with a curve, a slider and a changeup. By 1991 he had developed a good “split-finger” fastball to complement his high-velocity fastball. The downward movement of the split-finger fastball makes it an effectively deceptive pitch. By the mid 1990’s, he had mastered the split-finger fastball, and the combination of Clemens’ experience, his overpowering fastball, and his improved split-finger fastball led to two consecutive Cy Young Awards in what the record shows to be the best pitching of his career. As Clemens aged and the speed of his fastball slowed from the mid-90’s to the low 90’s, he relied increasingly on his control and his split-finger fastball. He also threw more two-seam fastballs that had a lot of lateral movement. This combination made him a superior pitcher, even as his velocity decreased to a roughly average rate for the major leagues.

After pitching for 20 years in the American League East Division, Clemens moved to the National League and pitched for the Houston Astros from 2004 through 2006. Clemens – now in his forties – was an extremely experienced and knowledgeable pitcher when he reached Houston. He was also pitching for his hometown team for the first time in his career.

Out of deference to Clemens’ age and family commitments, the Astros allowed him to avoid travel when he was not pitching. This enabled him to reduce the fatigue that naturally follows extensive travel during the season. In 2006, Clemens did not begin pitching until June, which helped him to avoid wearing down over the course of a full season. These precautions helped Clemens enjoy a resurgence late in his career.

While the best years of Clemens’ career occurred at different times throughout his career, so did his worst seasons. As should be expected, Clemens’ ERA Margins dropped in seasons when he suffered injuries. Four of his six lowest margins came when he was placed on the disabled list, as indicated by the red highlighting for those seasons in Chart 3.

Clemens posted his worst ERA Margin in his rookie season, 1984. As it turns out, he was badly roughed up in five of his first six starts that year. His ERA stood at 7.13 after the sixth start, burdening him with an ERA Margin of -3.14. Over the rest of the regular season, encompassing 20 starts, one relief appearance, and 98.0 innings of work, he recorded a 3.31 ERA, which gave him a healthy ERA Margin of +0.68 for that period.

The year-to-year variations in Roger Clemens’ ERA Margin are by no means unusual. An analysis of two distinguished contemporaries of Clemens, Randy Johnson and Curt Schilling, shows that year-to-year variations in ERA Margin are to be expected throughout the career of a starting pitcher.

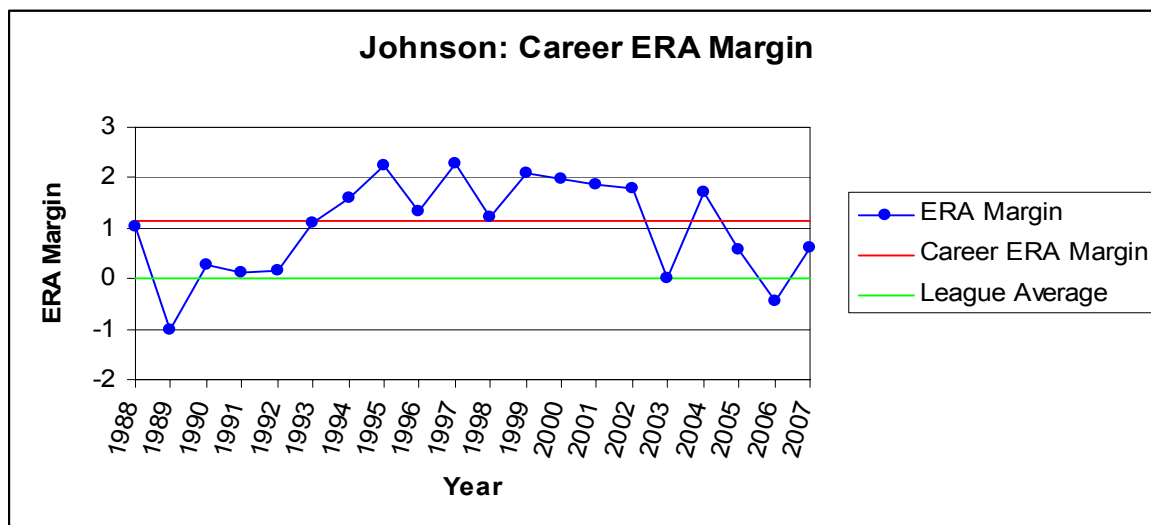
**Chart 5
Randy Johnson: Career Performance**

Year	Club	G	GS	IP	H	BB	SO	W	L	Pct.	ERA	Margin
1988	Mon	4	4	26.0	23	7	25	3	0	1.000	2.42	+1.03
1989	Mon-Sea	29	28	160.2	147	96	130	7	13	.350	4.82	-1.00
1990	Sea	33	33	219.2	174	120	194	14	11	.560	3.65	+0.26
1991	Sea	33	33	201.1	151	152	228	13	10	.565	3.98	+0.12
1992	Sea	31	31	210.1	154	144	241	12	14	.462	3.77	+0.17
1993	Sea	35	34	255.1	185	99	308	19	8	.704	3.24	+1.09
1994	Sea	23	23	172.0	132	72	204	13	6	.684	3.19	+1.61
1995	Sea	30	30	214.1	159	65	294	18	2	.900	2.48	+2.24
1996	Sea	14	8	61.1	48	25	85	5	0	1.000	3.67	+1.33
1997	Sea	30	29	213.0	147	77	291	20	4	.833	2.28	+2.29
1998	Sea-Hou	34	34	244.1	203	86	329	19	11	.633	3.28	+1.23
1999	Ari	35	35	271.2	207	70	364	17	9	.654	2.48	+2.09
2000	Ari	35	35	248.2	202	76	347	19	7	.731	2.64	+1.99
2001	Ari	35	34	249.2	181	71	372	21	6	.778	2.49	+1.87
2002	Ari	35	35	260.0	197	71	334	24	5	.828	2.32	+1.79
2003	Ari	18	18	114.0	125	27	125	6	8	.429	4.26	+0.02
2004	Ari	35	35	245.2	177	44	290	16	14	.533	2.60	+1.70
2005	NYY	34	34	225.2	207	47	211	17	8	.680	3.79	+0.56
2006	NYY	33	33	205.0	194	60	172	17	11	.607	5.00	-0.44
2007	Ari	10	10	56.2	52	13	72	4	3	.571	3.81	+0.62
Totals		566	556	3855.1	3065	1422	4616	284	150	.654	3.22	1.13

Like Clemens, Randy Johnson's ERA margin has risen and fallen from year to year over the course of his career. The graph below shows the year-to-year variations of Johnson's career.

It reveals that Johnson's ERA Margin was below the league average on two occasions. His ERA Margins were below his career average in 10 different years and above his career average in 10 other years. Johnson did maintain a consistent ERA Margin for one period, from 1999 through 2002.

Chart 6

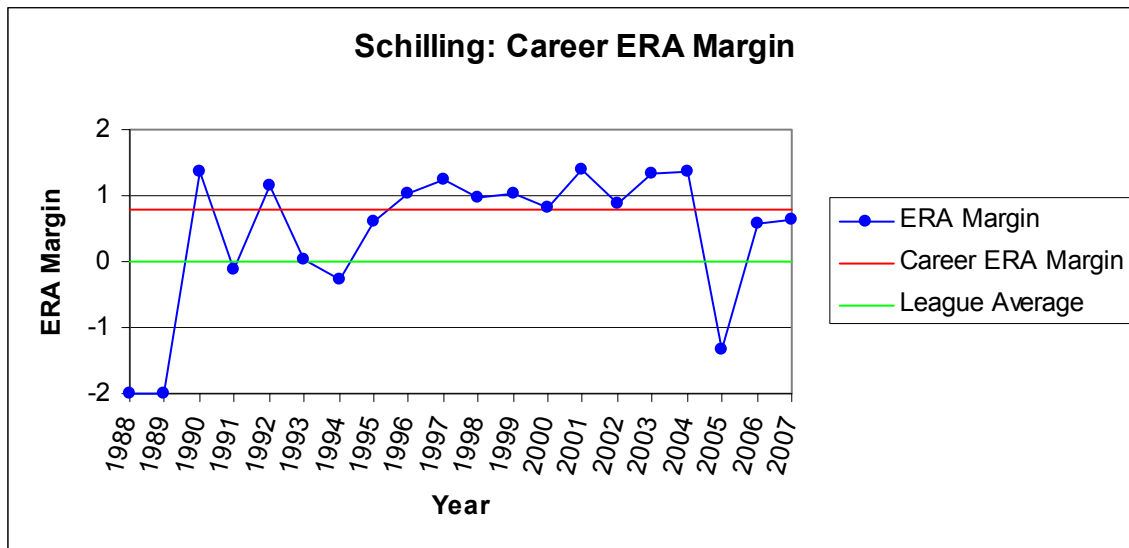


**Chart 7
Curt Schilling: Career Performance**

Year	Club	G	GS	IP	H	BB	SO	W	L	Pct.	ERA	Margin
1988	Bal	4	4	14.2	22	10	4	0	3	.000	9.82	-5.85
1989	Bal	5	1	8.2	10	3	6	0	1	.000	6.23	-2.34
1990	Bal	35	0	46.0	38	19	32	1	2	.333	2.54	+1.37
1991	Hou	56	0	75.2	79	39	71	3	5	.375	3.81	-0.12
1992	Phi	42	26	226.1	165	59	147	14	11	.560	2.35	+1.16
1993	Phi	34	34	235.1	234	57	186	16	7	.696	4.02	+0.02
1994	Phi	13	13	82.1	87	28	58	2	8	.200	4.48	-0.26
1995	Phi	17	17	116.0	96	26	114	7	5	.583	3.57	+0.62
1996	Phi	26	26	183.1	149	50	182	9	10	.474	3.19	+1.03
1997	Phi	35	35	254.1	208	58	319	17	11	.607	2.97	+1.24
1998	Phi	35	35	268.2	236	61	300	15	14	.517	3.25	+0.98
1999	Phi	24	24	180.1	159	44	152	15	6	.714	3.54	+1.03
2000	Phi-Ari	29	29	210.1	204	45	168	11	12	.478	3.81	+0.82
2001	Ari	35	35	256.2	237	39	293	22	6	.786	2.98	+1.38
2002	Ari	36	35	259.1	218	33	316	23	7	.767	3.23	+0.88
2003	Ari	24	24	168.0	144	32	194	8	9	.471	2.95	+1.33
2004	Bos	32	32	226.2	206	35	203	21	6	.778	3.26	+1.37
2005	Bos	32	11	93.1	121	22	87	8	8	.500	5.69	-1.34
2006	Bos	31	31	204.0	220	28	183	15	7	.682	3.97	+0.59
2007	Bos	24	24	151.0	165	23	101	9	8	.529	3.87	+0.64
Totals		569	436	3261.0	2998	711	3116	216	146	.597	3.46	0.80

Schilling's ERA Margin varied between a high of +1.38 and a low of -1.34 over the course of his career, excluding the 1988 and 1989 seasons, in which he pitched 14.2 and 8.2 innings, respectively. The graph below illustrates the year-to-year variations in Schilling's ERA Margin.

Chart 8



1988 and 1989 are placed at the bottom of graph due to scale.

As with Clemens and Johnson, Schilling's ERA Margin had ups and downs over the course of his career. While Schilling did not ever post an ERA Margin above +1.38, he did have a relatively consistent eight-year period between 1996 and 2004. But even within that period, the year-to-year variations ranged from a low of +0.82 to a high of +1.38, which is a gap of more than half a

run in ERA Margin. Schilling's sharpest variation occurred between 2004 and 2006, when his ERA Margin dropped from +1.37 to -1.34 and rose again to +0.59.

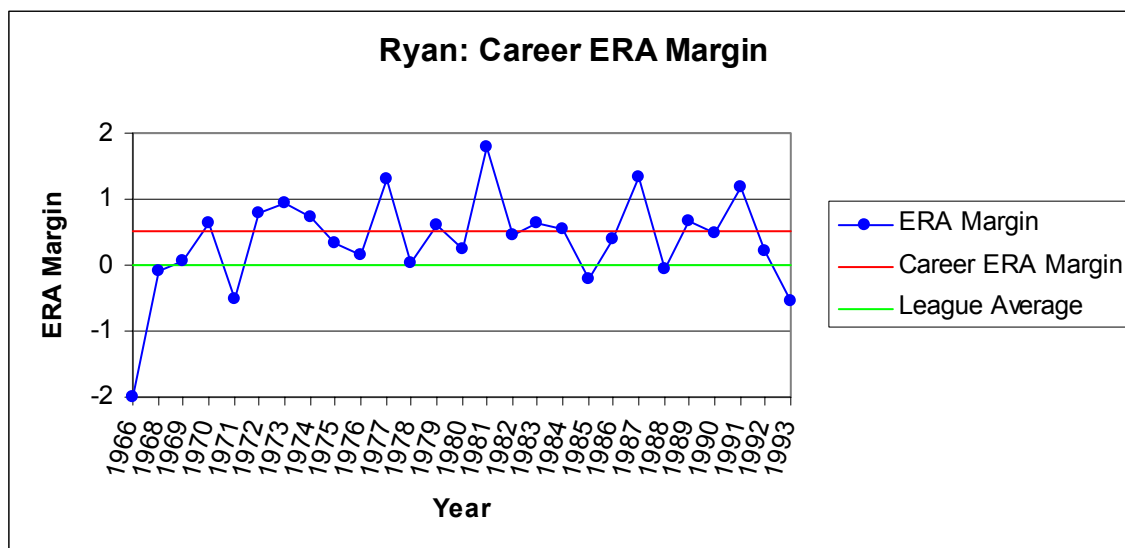
It is also useful to compare the variations in ERA Margin over the course of Clemens' career to the ERA Margin of a Hall of Fame pitcher whose major league career lasted 27 years, three years longer than the career of Roger Clemens. That pitcher is Nolan Ryan, the all-time strikeout leader in Major League Baseball.

The chart below reveals that Ryan's career ERA Margin was +0.52, less than half of Clemens' career ERA Margin of +1.25. Excluding his 1966 season in which he pitched a total of 3.0 innings, Ryan's ERA Margin varies between a high of +1.80 in an abbreviated season and a low of -0.56. Ryan's second best ERA Margin was in 1987, when he was the National League ERA champion with a 2.76 ERA.

Chart 9
Nolan Ryan: Career Performance

Year	Club	G	GS	IP	H	BB	SO	W	L	Pct.	ERA	Margin
1966	NYM	2	1	3.0	5	3	6	0	1	.000	15.00	-11.39
1968	NYM	21	18	134.0	93	75	133	6	9	.400	3.09	-0.10
1969	NYM	25	10	89.1	60	53	92	6	3	.667	3.53	+0.06
1970	NYM	27	19	131.2	86	97	125	7	11	.389	3.42	+0.63
1971	NYM	30	26	152.0	125	116	137	10	14	.417	3.97	-0.50
1972	Cal	39	39	284.0	166	157	329	19	16	.543	2.28	+0.78
1973	Cal	41	39	326.0	238	162	383	21	16	.568	2.87	+0.95
1974	Cal	42	41	332.2	221	202	367	22	16	.579	2.89	+0.73
1975	Cal	28	28	198.0	152	132	186	14	12	.538	3.45	+0.33
1976	Cal	39	39	284.1	193	183	327	17	18	.486	3.36	+0.16
1977	Cal	37	37	299.0	198	204	341	19	16	.543	2.77	+1.29
1978	Cal	31	31	234.2	183	148	260	10	13	.435	3.72	+0.04
1979	Cal	34	34	222.2	169	114	223	16	14	.533	3.60	+0.62
1980	Hou	35	35	233.2	205	98	200	11	10	.524	3.35	+0.25
1981	Hou	21	21	149.0	99	68	140	11	5	.688	1.69	+1.80
1982	Hou	35	35	250.1	196	109	245	16	12	.571	3.16	+0.44
1983	Hou	29	29	196.1	134	101	183	14	9	.609	2.98	+0.65
1984	Hou	30	30	183.2	143	69	197	12	11	.522	3.04	+0.55
1985	Hou	35	35	232.0	205	95	209	10	12	.455	3.80	-0.21
1986	Hou	30	30	178.0	119	82	194	12	8	.600	3.34	+0.38
1987	Hou	34	34	211.2	154	87	270	8	16	.333	2.76	+1.32
1988	Hou	33	33	220.0	186	87	228	12	11	.522	3.52	-0.07
1989	Tex	32	32	239.1	162	98	301	16	10	.615	3.20	+0.68
1990	Tex	30	30	204.0	137	74	232	13	9	.591	3.44	+0.47
1991	Tex	27	27	173.0	102	72	203	12	6	.667	2.91	+1.18
1992	Tex	27	27	157.1	138	69	157	5	9	.357	3.72	+0.22
1993	Tex	13	13	66.1	54	40	46	5	5	.500	4.88	-0.56
Totals		807	773	5386.0	3923	2795	5714	324	292	.526	3.19	0.52

Chart 10



1966 is placed at the bottom of graph due to scale; in minors in 1967.

The graph of Ryan's ERA Margin most closely resembles that of Clemens in that they both have more frequent variations between highs and lows. As shown in the graph, Ryan's peaks occur throughout his career. As with Clemens, Ryan posted two of his highest ERA Margins after the age of 40, from 1987 to 1993.

Another similarity between Ryan and Clemens is found by comparing Ryan's 1987 season to Clemens' 1996 season. In 1987, Ryan had the best ERA in the National League. His margin for the 1987 season was +1.32. Clemens' ERA Margin in 1996 was +1.37. In 1987, Ryan struck out 270 batters to lead the National League, while Clemens struck out 257 in 1996 to lead the American League. Despite the outstanding individual performances by both pitchers, Ryan posted a won-lost record of 8-16 in 1987, while Clemens posted a won-lost record of 10-13 in 1996.

The discussion of run support in the following section explains this discrepancy between won-lost record and individual performance.

B. The Effect of Run Support on Won-Lost Records

In order to determine how Roger Clemens' won-lost records correspond to his ERA margins, his seasonal performances must be placed in the context of the run support that he received from his offensive teammates.

Chart 11
Roger Clemens: Correlation of ERA Margins and Run Support to Won-Lost Records

Year	Club	GS	IP	ERA	Margin	RS/9	Margin	Run Support	W	L
1984	Bos	20	133.1	4.32	-0.33	n/a	Average	not available	9	4
1985	Bos	15	98.1	3.29	+0.86	n/a	High	not available	7	5
1986	Bos	33	254.0	2.48	+1.70	n/a	Very high	not available	24	4
1987	Bos	36	281.2	2.97	+1.49	n/a	Very high	not available	20	9
1988	Bos	35	264.0	2.93	+1.04	4.2	Superior	Average	18	12
1989	Bos	35	253.1	3.13	+0.76	5.2	Good	High	17	11
1990	Bos	31	228.1	1.93	+1.98	4.5	Highest Lvl.	Average	21	6
1991	Bos	35	271.1	2.62	+1.48	4.4	Superior	Average	18	10
1992	Bos	32	246.2	2.41	+1.53	4.2	Superior	Average	18	11
1993	Bos	29	191.2	4.46	-0.13	3.7	Average	Very low	11	14
1994	Bos	24	170.2	2.85	+1.95	4.1	Highest Lvl.	Very low	9	7
1995	Bos	23	140.0	4.18	+0.54	5.9	Good	High	10	5
1996	Bos	34	242.2	3.63	+1.37	4.3	Superior	Very low	10	13
1997	Tor	34	264.0	2.05	+2.52	5.0	Highest Lvl.	Average	21	7
1998	Tor	33	234.2	2.65	+2.00	5.0	Highest Lvl.	Average	20	6
1999	NYY	30	187.2	4.60	+0.26	4.9	Average	Average	14	10
2000	NYY	32	204.1	3.70	+1.21	5.4	Superior	Average	13	8
2001	NYY	33	220.1	3.51	+0.96	6.6	Superior	Top Level	20	3
2002	NYY	29	180.0	4.35	+0.11	5.1	Average	Average	13	6
2003	NYY	33	211.2	3.91	+0.61	5.8	Good	High	17	9
2004	Hou	33	214.1	2.98	+1.32	4.8	Superior	Average	18	4
2005	Hou	32	211.1	1.87	+2.35	3.6	Highest Lvl.	Low	13	8
2006	Hou	19	113.1	2.30	+2.19	4.3	Highest Lvl.	Low	7	6
2007	NYY	17	99.0	4.18	+0.33	3.9	Average	Low	6	6
Totals		707	4916.2	3.12	+1.25	4.8	Very high	Average	354	184

Margin – league ERA minus Clemens' ERA. RS/9 – run support per 9 innings for Roger Clemens.

Margin categories: Tier 1: Average; Tier 2: Good; Tiers 3 and 4: Superior; Tiers 5 and 6: Highest Level.

RS/9 categories, as compared to league average for the year:
 Very low: below -0.9; low: -0.9 to -0.5; average: -0.4 to 0.4; high: 0.5 to 0.9; very high: 0.9 to 1.4; highest: 1.5 or higher

Chart 12
League Averages in Run Support per 9 Innings

League	Year	RS/9	League	Year	RS/9
A.L.	1988	4.4	A.L.	1998	5.0
A.L.	1989	4.3	A.L.	1999	5.2
A.L.	1990	4.3	A.L.	2000	5.3
A.L.	1991	4.5	A.L.	2001	4.8
A.L.	1992	4.3	A.L.	2002	4.8
A.L.	1993	4.7	A.L.	2003	4.9
A.L.	1994	5.2	N.L.	2004	4.7
A.L.	1995	5.1	N.L.	2005	4.5
A.L.	1996	5.4	N.L.	2006	4.8
A.L.	1997	4.9	A.L.	2007	4.8
			20-Year	Avg.	4.8

Chart Revisions

Run support values have been added to the year-by-year statistics in the above chart so that each season can be observed in the context of both the ERA Margin and the run support that Roger Clemens has received. In the statistical section of the chart, on the left side, the games column (G) has been removed, and a column showing run support per 9 innings (RS/9) has been inserted.

Official run support figures are not available for the first four years of his career, through 1987. The box below the chart displays the year-by-year run support averages after 1987 for the relevant leagues.

In the "Margins" and "Run Support" columns in the right section of the chart are brief summaries of the levels of run support and the general quality of the corresponding ERA Margins for Clemens. In the right section of the main chart, the entry in the Margin column for 1988 is "Superior." This comment corresponds to the +1.04 ERA Margin that he posted in 1988. The comment in the Run Support column is "Average." It refers to the 4.2 runs of support that he received in that year. (The first line in the League Average RS/9 chart shows that American League pitchers received an average of 4.4 runs of support in 1988, which places the 4.2 rate in the average range).

The last column contains Clemens' won-lost records. It reveals that he won 18 games and lost 12 in 1988. And so the right section of the chart for 1988 can be translated as, "Clemens' superior ERA Margin (+1.04) and average run support (4.2 per 9) produced an 18-12 won-lost record."

Taken as a whole for the 20 years of Clemens' career for which run-support values are available, the chart demonstrates that his won-lost records are strongly correlated with the levels of his run support and ERA Margins in most seasons.

The Sources of Clemens' Career Won-Lost Record

For a starting pitcher, ERA Margin is the driving force behind his won-lost record in the long run. The higher the ERA Margin, the better his record will be. As noted, however, a starter's won-lost record can be distorted in any particular year by the amount of run support that his offensive teammates give him and by the quality of the relief pitchers who pitch behind him. In purely statistical terms, as the sample size grows, the external factors of run support and quality of relief pitching tend to regress to the mean. The longer one pitches, the greater the size of the statistical sample and the greater the agreement between his ERA Margin and his won-lost record. By the time a pitcher approaches 2000 innings pitched, his career ERA Margin and career won-lost record will be in close agreement.

The notion that run support heavily affects a starting pitcher's won-lost record is broadly accepted. For example, the Baltimore Orioles argued in a salary arbitration case in 2006 that Rodrigo Lopez' career won-lost record of 51-43 as of 2005 was a product not of Lopez' good pitching, but rather of the above average run support he received.

The last column in the "Totals" line on the above chart shows that Roger Clemens has compiled a career ERA margin of +1.25. This means that his actual career ERA of 3.12, shown in the next to last column, has been 1.25 earned runs better than the corresponding league ERA. This is one of the highest career ERA Margins ever recorded by a starting pitcher and is clearly the principal source of his 354-184 won-lost record.

As shown on the totals line, Clemens' run support per 9 innings has averaged 4.8 runs. The average number of runs scored per game in the leagues in which Clemens has performed over

the past 24 years has also been 4.8. Therefore, Roger Clemens has received average run support from his offensive teammates over the course of his career.

A detailed technical analysis would show that there is a high level of agreement between the won-lost records and the underlying ERA Margins and run support values for Roger Clemens in most years. One exception is Clemens' 2002 season with the Yankees, in which he chalked up a 13-6 record despite having an "average" ERA Margin and "average" run support. A review of the game logs for that season reveals that Clemens and his teammates were the beneficiaries of fortunate timing. For instance, he received a "no decision" in three particularly poor appearances.

The only way to evaluate the effect of the quality of relief pitching on a starting pitcher's career is to go through each and every game he pitched over his career. To make such comparisons to other starting pitchers would require an evaluation of each and every game they pitched. And so, to make such comparisons for the careers of many starting pitchers would require a review of game after game, year after year. While this task could be done, such a massive effort was impractical due to time constraints for this report.

Nevertheless, the above charts show that Roger Clemens' year-by-year wins and losses are generally in agreement with his ERA Margin and run support. The ebb and flow of his career can also be analyzed by reintroducing the above chart and adding shading to reflect his injury-marred seasons. The revised chart appears below.

Chart 13
Effect of Injuries (Official Disabled List) on Roger Clemens' Performance

Year	Club	GS	IP	W	L	Pct.	RS/9	ERA	Margin	Time Lost
1984	Bos	20	133.1	9	4	.692	----	4.32	-0.33	Rookie year.
1985	Bos	15	98.1	7	5	.583	----	3.29	+0.86	DL 7/8 to 8/3 and 8/21 to end of season
1986	Bos	33	254.0	24	4	.857	----	2.48	+1.70	
1987	Bos	36	281.2	20	9	.690	----	2.97	+1.49	
1988	Bos	35	264.0	18	12	.600	4.2	2.93	+1.04	
1989	Bos	35	253.1	17	11	.607	5.2	3.13	+0.76	
1990	Bos	31	228.1	21	6	.778	4.5	1.93	+1.98	
1991	Bos	35	271.1	18	10	.643	4.4	2.62	+1.48	
1992	Bos	32	246.2	18	11	.621	4.2	2.41	+1.53	
1993	Bos	29	191.2	11	14	.440	3.7	4.46	-0.13	DL 6/9 to 7/16
1994	Bos	24	170.2	9	7	.563	4.1	2.85	+1.95	
1995	Bos	23	140.0	10	5	.667	5.9	4.18	+0.54	DL 4/16 to 6/2
1996	Bos	34	242.2	10	13	.435	4.3	3.63	+1.37	
1997	Tor	34	264.0	21	7	.750	5.0	2.05	+2.52	
1998	Tor	33	234.2	20	6	.769	5.0	2.65	+2.00	
1999	NYY	30	187.2	14	10	.583	4.9	4.60	+0.26	DL 4/28 to 5/21
2000	NYY	32	204.1	13	8	.619	5.4	3.70	+1.21	DL 6/15 to 7/2
2001	NYY	33	220.1	20	3	.870	6.6	3.51	+0.96	
2002	NYY	29	180.0	13	6	.684	5.1	4.35	+0.11	DL 7/13 to 8/7
2003	NYY	33	211.2	17	9	.654	5.8	3.91	+0.61	
2004	Hou	33	214.1	18	4	.818	4.8	2.98	+1.32	
2005	Hou	32	211.1	13	8	.619	3.6	1.87	+2.35	
2006	Hou	19	113.1	7	6	.538	4.3	2.30	+2.19	On roster for 56% of season.
2007	NYY	17	99.0	6	6	.500	3.9	4.18	+0.33	On roster for 63% of season.
Totals		707	4916.2	354	184	.658	4.8	3.12	+1.25	

DL – placed on the official disabled list for the indicated dates

As discussed earlier, a pitcher's ERA Margin is most often negatively affected in seasons in which he is injured. This is typically the result of poor performances turned in by the pitcher while suffering from an injury but prior to his being placed on the disabled list. Likewise, it can be caused by poor performances by a pitcher returning from the disabled list prior to full recovery. Moreover, the time missed on the disabled list gives a period of poor performance greater influence upon the season's statistics, because the missed time reduces the sample size.

In each of his two most recent seasons, Clemens pitched for shortened seasons through contractual agreements with the Astros and the Yankees. This approach worked extremely well in 2006 for the then 43-year-old pitcher, when he posted the third highest ERA margin of his career. He followed up with a personally sub par but quite respectable performance in New York in 2007. He had nagging injuries in the 2007 season that did not warrant a trip to the disabled list but that nonetheless caused him to miss starts and diminished his overall effectiveness.

C. Performance Peaks and Valleys: A Month-by-Month Analysis

The variations in performance between seasons are mirrored in a pitcher's performance in individual months. In nearly every season, a starting pitcher will have hot streaks and cold spells, and they are often more pronounced than season-to-season variations. The chart below describes the peaks and valleys of Roger Clemens' career since 1984 on a month-by-month basis.

Chart 14
Roger Clemens: Performance Peaks and Valleys since 1984

Peaks					Valleys				
Year	Month(s)	G	IP	ERA	Year	Month(s)	G	IP	ERA
1986	Apr	4	33.1	1.62	----	----	--	----	----
1986	Jun	6	50.0	1.44	----	----	--	----	----
1986	Sep	5	39.0	1.85	1984	May-Jul	15	89.2	5.02
1987	Sep	6	50.2	1.78	1987	Jun	6	42.1	5.53
1988	Apr-May	12	104.0	1.82	1988	Aug	5	27.0	7.33
1988	Jul	6	49.1	1.64	1993	Jun	4	23.0	6.65
1989	Apr	6	46.0	1.96	1993	Aug-Sep	10	58.2	7.06
1990	Jul	6	45.0	1.00	1995	Jul	5	26.1	8.89
1990	Aug-Sep	8	60.2	1.19	1996	Apr-Jun	17	118.1	4.18
1991	Apr	4	32.0	0.28	1999	Apr	5	26.1	5.47
1991	Jun	5	41.2	1.94	1999	Jun-Jul	11	73.2	5.13
1991	Sep	5	43.0	1.67	1999	Sep	6	38.0	5.21
1992	Apr-May	11	90.0	1.60	2000	May-Jun	8	42.2	6.12
1992	Aug	6	47.1	1.90	2001	Apr	6	41.1	4.36
1993	Apr	5	38.1	1.64	2001	May	5	34.2	4.15
1994	May	5	35.0	1.80	2002	Apr	6	39.0	4.62
1994	Jul	5	36.2	1.96	2002	Jun	5	30.1	5.04
1996	Aug	5	39.0	1.85	2002	Aug	5	31.0	6.10
1997	Apr-Jul	22	171.1	1.52	2003	May	5	30.1	5.04
1998	Jul-Aug	11	86.1	1.25	2003	Jul-Aug	11	69.1	5.06
2000	Jul	6	42.1	1.91	2004	Aug	6	36.0	4.25
2004	Apr	5	32.1	1.95	2005	Sep	4	20.0	5.40
2005	Apr-Aug	28	184.1	1.52	2007	Jun	5	23.2	5.32
2006	Jun-Jul	8	47.1	2.09	2007	Aug-Sep	7	34.2	4.67
	Totals	190	1445.0	1.66		Totals	157	956.1	5.29
	Career	709	4916.2	3.12		Career	709	4916.2	3.12

NOTES

The "Peaks" chart on the left is a record of all of the months in which Roger Clemens made at least four starts and had an ERA below 2.12 in the 24 seasons from 1984 through 2007. (In 1990, he made six starts in August and two in September. And in his abbreviated 2006 season, he made two starts in June and six starts in July. The values for those two pairs of months have been included among the peaks as single entries.)

The "Valleys" chart on the right contains all of the months in which Clemens made at least four starts and his ERA was above 4.12. (In 2007, he made five starts in August and two in September. The values for that pair of months are included among the valleys as a single entry.)

Data Limitations

In an ideal statistical environment, it would be possible to isolate the full periods during which Roger Clemens maintained an ERA below 2.12 or above 4.12. (For example, it is very likely that Clemens, who had a 0.28 ERA in April of 1992, sustained a sub-2.12 ERA through one or more of his starts in May of that year. Likewise, it can be assumed that he had numerous overlaps into other months when his monthly ERAs were extremely high.) As a result of this limitation, the peaks and valleys are limited to whole months. While this prevents a perfect accounting of Clemens' peaks and valleys, the chart provides an accurate picture of the highs and lows of his performance trends.

Findings

Observers of baseball are aware that pitchers and hitters have relatively good years and relatively bad years. They also know that players can experience extreme hot streaks and extreme cold spells during a major league season. The scoreless streaks of 50-plus innings pitched by Orel Hershiser and Brandon Webb are renowned examples, as is Joe DiMaggio's 56-game hit streak. There are also times when pitchers get torched by hitters for a solid month or two, and when batters hit in the .100's or the .400's for several weeks. The principal reason for the greater range of variation within seasons is very simply that the statistical samples are much smaller for months than they are for whole years.

The three entries for Roger Clemens in both the peak and the valley charts in 1988 are prime examples of extreme highs and lows in performance in a single season. Those charts show that his ERA was 1.82 from April through May. (Though his ERA in June did not exceed 4.12 and is not listed on the chart, it did rise to 4.08.) His ERA plummeted to 1.64 in July. Then it skyrocketed to 7.33 in August. (In September his ERA decreased sharply, once again, to 2.70, which also does not qualify for inclusion in the chart.) The four peak months covered 153.1 innings, while the August valley covered 27.0 innings. The charts of his yearly totals show that he finished the 1988 season with a 2.93 ERA. In the context of the three previous seasons and the four following seasons, 1988 looks like just another typical year. But the monthly breakdown of that year shows that Clemens' ERA actually varied sharply during the season.

The Peaks and Valleys chart also reveals that there were six other years in which Clemens experienced both high and low extremes within single seasons: 1987, 1993, 1996, 2000, 2004, and 2005. The "Totals" line on the chart shows that his peaks cover 1445.0 innings (29%) of his 4916.2-inning career, while his valleys cover 956.1 innings (19%). This lopsidedness at the positive end is, of course, to have been expected from such a high-quality pitcher, especially in light of the fact that the cutoff for his valleys has been set at an ERA of 4.12, which is better than the league average in every one of the 15 seasons that Clemens has pitched since 1993.

D. Performance Peaks and Valleys: Career Analysis

This section provides an in-depth analysis of the performance peaks and valleys of Roger Clemens' career over three different periods of time.

1. Boston: 1984 through 1996

Roger Clemens spent the first 13 years of his major league career with the Boston Red Sox. His statistical record for that period is displayed below.

Chart 15
Career Performance Record of Roger Clemens: 1984-1996

Year	Club	G	GS	IP	W	L	Pct.	ERA	Margin	Awards/Comments
1984	Bos	21	20	133.1	9	4	.692	4.32	-0.33	rookie season
1985	Bos	15	15	98.1	7	5	.583	3.29	+0.86	disabled, underwent surgery
1986	Bos	33	33	254.0	24	4	.857	2.48	+1.70	MVP, Cy Young, All-Star
1987	Bos	36	36	281.2	20	9	.690	2.97	+1.49	Cy Young
1988	Bos	35	35	264.0	18	12	.600	2.93	+1.04	All-Star
1989	Bos	35	35	253.1	17	11	.607	3.13	+0.76	
1990	Bos	31	31	228.1	21	6	.778	1.93	+1.98	All-Star
1991	Bos	35	35	271.1	18	10	.643	2.62	+1.48	Cy Young, All-Star
1992	Bos	32	32	246.2	18	11	.621	2.41	+1.53	All-Star
1993	Bos	29	29	191.2	11	14	.440	4.46	-0.13	disabled
1994 ¹	Bos	24	24	170.2	9	7	.563	2.85	+1.95	
1995 ²	Bos	23	23	140.0	10	5	.667	4.18	+0.54	disabled
1996	Bos	34	34	242.2	10	13	.435	3.63	+1.37	
Totals		383	382	2776.0	192	111	.655	3.00	+1.31	

¹ MLB work stoppage eliminated 50 games, or 31% of the season, from Boston's schedule.

² MLB work stoppage eliminated 18 games, or 11% of the season, from Boston's schedule.

In his 1984 rookie season, Clemens compiled an ERA Margin of -0.13. This is his lowest seasonal margin and one of only two times in his career that he did not outperform his league in ERA. Clemens' ERA stood at 7.13 after his sixth start of 1984, an ERA margin of -3.14. For the rest of the regular season, encompassing 20 starts, one relief appearance, and 98.0 innings of work, he recorded a 3.31 ERA, which gave him an ERA Margin of +0.68 for that period.

Although he pitched well through the first half of his 1985 sophomore season, Clemens was forced onto the disabled list with a sore shoulder in early July. After returning to the club in early August, he continued to struggle. Two weeks later, on August 21st, he was placed on the disabled list once again. The shoulder injury was severe and ultimately required a surgical repair by Dr. James Andrews, the famed orthopedic surgeon.

Clemens' comeback from surgery in 1986 was spectacular. In that first full season in the major leagues, he was selected to the All-Star team, won the Cy Young Award, and was crowned the American League's Most Valuable Player. His 24-4 won-lost record was driven by his +1.70 ERA margin. To put that margin in perspective, two other highly accomplished right-handed power pitchers, Curt Schilling and Hall of Fame member Nolan Ryan, never compiled an ERA margin greater than +1.38 in a full season of play. (Ryan posted a +1.80 margin in 149.0 innings in the strike-shortened 1981 season.)

Clemens would post seven more ERA Margins greater than 1.00 in his ten remaining years with Boston. Two of his margins below +1.00 came when he was officially disabled, in 1993 and 1995. The other instance was in 1989, when he finished the season with a +0.76 ERA margin and a 17-11 record.

Clemens also pitched a high number of innings in eight of the 11 seasons from 1986 through 1996. His innings pitched during those eight seasons ranged from 242.2 in 1996 to 281.2 in 1987. In 1993 and 1995, time on the disabled list left him with fewer innings pitched. Clemens also lost starts and innings to the 1994 work stoppage, which eliminated 50 games from Boston's regular-season schedule. The work stoppage continued for 18 games into the 1995 season and, in conjunction with Clemens' time on the disabled list, reduced his volume of innings pitched during the 1995 season.

In the six seasons from 1987 through 1992, he earned American League All-Star selections and/or Cy Young awards five times. The impressive but not exceptional 1989 season was the only one that went unaccompanied by a major honor or award.

In the abbreviated 1994 season, Clemens compiled a +1.98 ERA margin, the highest that he ever achieved in a Boston uniform. A severe lack of run support in 1994 led to only a 9-7 won-lost record for Clemens. If he had received merely average run support from the Red Sox in 1994, and if his +1.95 ERA margin had yielded a comparable winning percentage, he would have had a record of approximately 12-4, assuming he would have been credited with the same number of decisions.

The 1996 Season

Clemens would endure a similar lack of run support in 1996, his final year with the Red Sox. Clemens had a +1.37 ERA Margin for the season but only a 10-13 record. As shown in Section B of this report, the Red Sox hitters gave him only 4.3 runs per 9 innings, in a season in which the A.L. norm was 5.4 runs per 9. Clemens pitched extremely well in 1996, but given the lack of run support and the fact that Boston relievers blew six games in which Clemens left with the lead, his record is deceptive, particularly for those who place excessive emphasis on pitchers' wins and losses. In a December 1, 1996 article in the Boston Globe, noted baseball columnist Peter Gammons observed the misleading nature of Clemens' won-lost record, commenting that "everyone knows Clemens could have been 18-10 last season."

In 2004, Curt Schilling posted a +1.37 ERA Margin for the Red Sox, the same ERA Margin Clemens achieved in 1996. Schilling, however, emerged with a 21-6 record that propelled him to the A.L. All-Star team and to second place in the Cy Young Award voting, behind Johan Santana of the Minnesota Twins. Boston hitters treated Schilling to a colossal 7.5 runs of support per 9 innings in 2004, a full 2.5 runs and 50% higher than the A.L. average of 5.0. By comparison, Clemens received 4.3 runs of support per 9 innings in 1996, more than a full run less than the A.L. average of 5.4. This comparison takes nothing away from Schilling's 2004 performance, but it highlights the fact that Clemens would have had a far better won-lost record in 1996 if he had received merely average support from the Red Sox hitters.

Clemens was far from being in the "twilight of his career" or "washed up" in 1996, as some have speculated. During the 1996 season Clemens ranked first in strikeouts in the American League and tied his own record by striking out 20 batters in Detroit on September 18, 1996. In addition, he ranked sixth in the American League in ERA, second in the A.L. in hits per nine innings, and fifth in innings pitched. This performance cannot be reasonably categorized as a "twilight."

Peter Gammons, in the same Boston Globe article, commented on the overall quality of Clemens' performance in 1996 and over the course of his career in Boston, stating, "Clemens is so much more important than anyone else to the Red Sox." In making his case to re-sign Clemens, Gammons wrote, "The Red Sox need him not only because he is, as (Dan) Duquette says, 'the best pitcher in the history of the franchise', but also because he is the lead horse for a pitching staff they hope will be far better than last year's."

The historical context of Roger Clemens' Boston career

Gammons' opinion is supported by Clemens' performance in Boston. During his time with Boston, Roger Clemens pitched a total of 2776.0 innings in 382 starts. Taken together, the innings and starts comprise more than half of his full career totals. More important is that he had compiled a cumulative ERA margin of +1.31, which was the primary source of his won-lost record of 192-111 and his winning percentage of .634. Compare Clemens' statistics in Boston to those of eight starting pitchers who have been enshrined in the Major League Baseball Hall of Fame.

Chart 16
The Boston Totals of Roger Clemens Compared to the Career Totals of Eight Hall-of-Fame Starting Pitchers

Pitcher	G	GS	IP	W	L	Pct.
Sandy Koufax	397	314	2324.1	165	87	.655
Lefty Gomez	368	320	2503.0	189	102	.649
Dizzy Dean	317	230	1967.1	150	83	.644
Roger Clemens	383	382	2776.0	192	111	.634
Addie Joss	286	260	2327.0	160	97	.623
Ed Walsh	430	315	2964.1	195	126	.607
Jack Chesbro	392	332	2896.2	198	132	.600
Dazzy Vance	442	347	2967.0	197	140	.585
Rube Waddell	407	340	2961.1	193	143	.574

This chart is a list of Hall-of-Fame starting pitchers whose career innings roughly correspond to Roger Clemens' innings through his final season in Boston. The chart is presented in descending order of winning percentage. We have not calculated the ERA margins for the Hall of Fame members, whose careers span the period from 1897 to 1996. However, by the time starting pitchers have neared or exceeded the 2,000-inning mark, as these nine pitchers did, their won-lost records are highly consistent with their ERA margins.

Clemens ranks first in games started, fifth in innings pitched, and fourth in winning percentage. This comparison firmly establishes that he had already attained Hall of Fame quality and quantity in statistical terms before he became a free agent in November of 1996. Moreover, Roger Clemens tied the legendary Cy Young with 192 Boston victories, the highest total ever amassed by a pitcher in a Red Sox uniform.

2. The Apex of Clemens' Career: August 11, 1996 through April 10, 1999

Overview

Much commentary has been devoted to Clemens' outstanding performance in 1997 and 1998, when he won two Cy Young Awards with the Toronto Blue Jays. While some have suggested that Clemens' career was in doubt after the 1996 season, Clemens in fact began an excellent stretch of pitching on August 11, 1996, while still with the Boston Red Sox. Prior to August 11, Clemens was having a respectable season, but due to the inadequate support that he received, his record was a paltry 4 wins, 11 losses. Beginning on August 11th, Clemens started 10 games, pitched 77.2 innings, recorded a 2.09 ERA and posted a 6-2 won-lost record, despite receiving only 3.9 runs of support per game. As noted earlier, it was during this period that Clemens matched his record-setting feat of striking out 20 batters in a single game on September 18, 1996 against the Tigers in Detroit, on his way to leading the American League in strikeouts.

He continued this excellent stretch into 1997, when he won his 4th Cy Young Award, this time with the Toronto Blue Jays. In 1997, Clemens had 21 wins, an ERA of 2.05, and 292 strikeouts, all of which were the best in the American League, thereby achieving the unofficial pitching Triple Crown. Clemens repeated this Triple Crown performance in 1998, when he recorded 20 wins, an ERA of 2.65, and 271 strikeouts. These accomplishments earned Clemens his 5th Cy Young Award.

It has been suggested that Clemens' performance during July and August of 1998 was unusual. The Peaks and Valleys chart above shows that Clemens has had 24 peak periods totaling 36 peak months over the course of his career. That is an average of 1.5 peak months per year. The two-month, 86.1-inning peak period in his performance in 1998 is therefore well within the normal range for Clemens. The chart shows that the 1998 peak in ERA ranks only fifth in duration and only fourth in quality among the 24 peak periods in his career.

Equally significant is that Clemens put together a stretch of 171.1 innings with an ERA of 1.58 from April through July of 1997. This period of excellence in 1997 was twice as long as his peak period in 1998, again showing that the 1998 spike in performance was not unusual for a pitcher of Roger Clemens' caliber.

Chart 17
Roger Clemens' Performance Peak: August 11, 1996 through April 10, 1999

1996	W	L	IP	ER	SO
08-11	1	0	7.0	0	8
08-17	1	0	9.0	0	9
08-22	1	0	9.0	1	11
08-27	1	0	8.0	0	7
09-02	0	0	6.0	3	4
09-07	0	1	8.0	4	8
09-13	1	0	7.0	5	4
09-18	1	0	9.0	0	20
09-23	0	0	7.0	1	8
09-28	0	1	7.2	4	10
Totals	6	2	77.2	18	89
			Avg.	2.09	10.3
1997	W	L	IP	ER	SO
04-02	1	0	9.0	1	9
04-09	1	0	5.2	0	7
04-19	1	0	7.0	0	4
04-25	0	0	7.0	6	2
04-30	1	0	8.0	0	7
05-05	1	0	9.0	1	10
05-10	1	0	7.0	4	14
05-16	1	0	7.0	1	4
05-21	1	0	8.0	1	12
05-26	1	0	7.0	1	7
05-31	1	0	8.0	2	4
06-06	1	0	8.0	0	8
06-11	0	1	7.0	4	5
06-16	0	1	9.0	3	12
06-21	0	0	7.0	0	8
06-26	1	0	7.1	0	9
07-01	0	1	8.1	2	8
07-06	1	0	9.0	0	10
07-12	1	0	8.0	1	16
07-17	1	0	9.0	1	10
07-23	1	0	8.0	0	7
07-28	0	1	8.0	1	10
08-02	0	0	6.0	6	9
08-07	1	0	9.0	0	10
08-12	1	0	9.0	1	13
08-17	1	0	7.0	4	11
08-22	1	0	7.1	2	4
08-28	0	0	9.0	0	7
09-02	0	1	6.0	6	7
09-07	1	0	9.0	0	14
09-12	0	1	7.0	6	5
09-18	0	0	7.0	1	10
09-23	0	1	8.0	3	11
09-28	0	0	8.1	2	8
Totals	21	7	264.0	60	292
			Avg.	2.05	10.0

1998	W	L	IP	ER	SO	1998 Notes
04-01	1	0	7.0	1	3	
04-07	0	1	0.0	2	0	Injured in 1 st inning.
gap	--	--	----	--	--	Missed a start.
04-17	1	0	6.2	1	7	
04-22	0	1	6.2	6	6	Still hampered and pitching erratically through the start on May 18 th .
04-27	0	1	7.0	1	8	
05-02	1	0	7.0	0	7	
05-07	1	0	7.0	0	6	
05-13	0	1	8.0	1	9	
05-18	0	1	5.0	9	5	
05-23	1	0	8.0	2	9	Back on track, with strikeouts on the rise.
05-29	0	1	7.0	4	9	
06-03	1	0	9.0	1	10	
06-08	0	0	7.0	3	8	
06-14	1	0	5.1	4	3	6.75 ERA, win.
06-19	0	0	5.0	3	8	5.40 ERA, no decision.
06-24	1	0	7.0	5	4	6.43 ERA, win.
06-30	1	0	9.0	3	11	
07-05	0	0	7.1	1	7	
07-12	1	0	7.1	2	10	
07-17	1	0	7.0	1	10	
07-22	1	0	8.0	0	4	
07-28	1	0	6.2	3	4	4.05 ERA, win.
08-02	1	0	8.0	1	14	
08-09	0	0	7.0	2	8	
08-15	0	0	8.0	2	15	
08-20	1	0	9.0	0	6	
08-25	1	0	9.0	0	18	
08-30	1	0	9.0	0	7	
09-05	1	0	8.0	2	11	
09-11	0	0	5.0	3	7	5.40 ERA, no decision.
09-16	1	0	7.2	1	11	
09-21	1	0	8.0	1	15	
09-26	0	0	8.0	4	11	4.50 ERA, no decision
Totals	20	6	234.2	69	271	
			Avg.	2.65	10.4	
1999	W	L	IP	ER	SO	
04-05	0	0	6.1	3	8	
04-10	1	0	7.2	0	8	
Totals	1	0	14.0	1.93	16	

Blue box – average of 10 or more strikeouts per 9 innings. ERA in “1998 Notes” is for that game, only.

The four sections in the above chart contain the game-by-game statistics for Roger Clemens for the period that comprises the apex of his career. The period begins on August 11, 1996 and extends through April 10, 1999. His cumulative record for that time is as follows:

Chart 18
Career Apex Totals: 8/11/96 through 4/10/99

G	W	L	Pct.	IP	ERA	SO/9
79	48	15	.762	590.1	2.21	10.2

Strikeout peaks and valleys

An analysis of Roger Clemens' performance as a strikeout pitcher also demonstrates that the peaks and valleys of performance occur month to month as well as year to year. The strikeouts that are displayed in blue boxes represent games in which Clemens averaged 10 or more strikeouts per 9 innings. They begin to appear with great regularity around the time of the 20-strikeout game that he pitched for the Red Sox against the Tigers in Detroit on September 18, 1996.

In 1997, Clemens did not achieve much consistency with his strikeouts until after his 13th start of that season, on June 11th. Though he did not have good outings on April 25th (6 earned runs in 7.0 innings) and May 10th (4 earned runs in 7.0 innings), he was able to emerge from his first 12 starts with a 1.69 ERA and an 11-0 record. Nearly all such win streaks depend on ample run support from one's teammates. Clemens was the beneficiary of 5.8 runs of support per 9 innings from the Toronto hitters during the streak, in a year in which the American League average was 4.9.

From June 16th through the rest of the 1997 season, he met or exceeded a strikeout rate of 10.0 per 9 innings 14 times in 21 games. For the year, his strikeout rate was 10.0 per 9 innings, as indicated on the "Avgs." line at the bottom of the 1997 section of the chart.

As in 1997, Clemens' 1998 season began slowly in terms of overall effectiveness and strikeouts. As noted on the last column of the 1998 section, he came out of his April 7th start due to an injury. In that game he surrendered 2 earned runs and did not retire a batter (0.0 innings pitched). The notes also show that he missed a start between April 7 and April 17. Clemens rebounded nicely in his April 17 start. However, as the notes indicate, he pitched erratically for another month, through May 18, due to the lingering effects of his injury.

From May 23 through June 8, 1998, he showed distinct signs that he had regained his form of the last two-thirds of the previous season. His strikeouts were over the 10.0 average per 9 innings for all four of those games, and his ERA was 2.90. Clemens would experience another dip, this time for the three games from June 14 to June 24.

Much as in 1997, he was completely on top of his game beginning with his June 30th start – a complete game with 11 strikeouts. Over the final 17 games of the 1998 season, starting with the June 30th outing, he registered 13 high-strikeout games and a 1.77 ERA. His record during that stretch was 12-0. Because he had notched wins in his three previous decisions, he finished the season with 15 wins without a loss. Clemens' ERA was 0.08 runs higher than the 1.69 ERA that drove his 11-win streak in 1997. He also had six sub par outings for which he posted 4 wins and 2 no-decisions. These sub par outings are identified in the "1998 Notes," as are the earned run averages that he registered in each of the games. Once again, Clemens needed help from his Toronto teammates to put together the streak. This time, however, it depended a bit more on timing, as his run support was only 4.3 per 9 innings. And the timing was indeed excellent. In the six sub par games, the Blue Jays averaged 6.0 runs per 9. Included in those games was a no-

decision for Clemens that the Blue Jays lost. Furthermore, the club lost 2 of his other 6 no-decision games during the win streak.

1998 Season Summary

Roger Clemens' performance in 1998 was a continuation of the success that began on August 11, 1996. The high point of this remarkable stretch of pitching came in the first two-thirds of the 1997 season, when he maintained a 1.58 ERA in 22 games and 171.1 innings of pitching. The statistics below show that in 1997 Clemens made one more start, pitched 29.1 more innings, and posted an ERA Margin 0.52 runs better than he did in 1998.

Chart 19
Roger Clemens: Statistics for 1997-1998

Year	Club	GS	IP	W	L	Pct.	RS/9	ERA	Margin
1997	Tor	34	264.0	21	7	.750	5.0	2.05	+2.52
1998	Tor	33	234.2	20	6	.769	5.0	2.65	+2.00

The 11- and 15-game win streaks that he put together in 1997 and 1998, respectively, were dependent on exceptional support from his Toronto teammates at critical times.

Beginning of the 1999 Season

Roger Clemens opened the 1999 season with two strong starts in which he recorded a 1.93 ERA, a 10.3 strikeout rate, and a 1-0 record. It looked like Clemens was beginning 1999 much the same way that he had ended 1998. Unfortunately, he would suffer an injury in late April of 1999 that would place him on the disabled list for more than three weeks. As the statistics for 1999 reveal, his overall performance after the first two starts in 1999 was well below his personal norms, marking the end of his career-best period.

3. New York and Houston: 1999 through 2007

Joining the Yankees

The 1999, 2000 and 2001 Seasons

After the two starts that opened his 1999 season, Clemens struggled in two of his next three starts, posting a 9.48 ERA in 12.1 innings of work. In the third outing, on April 27th, he was taken out of the game after surrendering 5 earned runs in just 2.0 innings. On the next day, Clemens was placed on the disabled list, where he would remain until May 22nd.

Chart 20
Monthly Breakdown for Roger Clemens in 1999

Year	Month	G	IP	ERA	H/9	BB/9	BR/9	HR9	SO/9
1999	April	5	26.1	5.47	8.9	5.8	14.7	1.7	7.9
1999	May	2	13.0	1.38	5.5	2.8	8.3	0.0	7.6
1999	June	6	36.1	4.95	12.1	3.2	15.3	0.7	9.7
1999	July	6	37.1	5.30	9.6	4.1	13.7	1.0	6.0
1999	August	5	36.2	3.44	7.9	3.7	11.5	0.7	6.1
1999	Sep/Oct	6	38.0	5.21	7.1	5.7	12.8	0.7	9.5
Totals		30	187.2	4.60	8.9	4.3	13.2	1.0	7.8

NOTE: The boxes on the right contain Clemens's rates per 9 innings in hits, walks, baserunners, and home runs allowed and in strikeouts recorded.

The two starts that he made in May went well. He recorded a 1.38 ERA and was credited with 2 wins. In his next three starts, through June 12th, he was credited with 2 wins and 1 loss, but his ERA for the three games was 7.05. At that point, Clemens's ERA for the season stood at 5.27 in 10 starts and 54.2 innings pitched. Thanks to timely support from the Yankees' hitters, who averaged 5.8 runs per game through his tenth start, he managed to post a 6-1 won-lost record despite having an ERA margin of -0.41.

From June 17th through the end of the season, Clemens' ERA for 20 games started and 133.0 innings pitched was 4.33, a +0.53 ERA margin. In normal circumstances this would have yielded a winning percentage distinctly above .500. However, the Yankees scored only 76 runs in those games, or 3.8 per game, and only 47 runs in 17 of the games, or 2.8 per game. As a result of this lack of support, his record was 8-9.

Clemens finished the season with a 14-10 record and a +0.26 ERA margin. This was the fourth lowest margin of his career and clearly a product of the sharp decline that he experienced in most of the games leading up to his disablement.

Chart 21
Monthly Breakdowns for Roger Clemens in 2000 and 2001

Year	Month	G	IP	ERA	H/9	BB/9	BR/9	HR/9	SO/9
2000	April	6	38.2	3.26	8.6	4.7	13.3	0.7	8.4
2000	May	5	31.2	4.83	8.5	2.3	10.8	2.0	9.7
2000	June	3	11.0	9.82	13.9	7.4	21.3	2.5	9.0
2000	July	6	42.1	1.91	6.8	3.4	10.2	0.4	7.2
2000	August	6	41.2	3.23	7.3	4.1	11.4	1.1	7.6
2000	Sept.	6	39.0	3.92	7.8	2.8	10.6	1.4	8.8
Totals		32	204.1	3.70	8.1	3.7	11.8	1.1	8.3

Year	Month	G	IP	ERA	H/9	BB/9	BR/9	HR9	SO/9
2001	April	6	41.1	4.36	8.1	3.0	11.1	0.7	6.8
2001	May	5	34.2	4.15	8.8	2.9	11.7	1.0	10.4
2001	June	6	41.2	2.38	8.4	2.6	11.0	0.6	9.7
2001	July	5	30.2	3.52	8.5	2.6	11.2	1.5	9.1
2001	August	6	40.2	3.10	8.4	2.2	10.6	0.2	8.6
2001	Sep/Oct	5	31.1	3.73	8.1	4.6	12.6	0.9	7.8
Totals		33	220.1	3.51	8.4	2.9	11.3	0.8	8.7

Summary

After his injury-affected 1999 season, Roger Clemens posted ERA Margins of +1.21 and +0.96 in the next two seasons. These Margins were somewhat below his career average Margin of +1.25.

The above charts track his performances on a month-by-month basis. In June of 2000, Clemens posted his worst month of the year. He was injured and placed on the disabled list during that month and pitched quite poorly in the three starts that he did make, as evidenced by the 9.82 ERA that he compiled. Clemens then put together an exceptional July before settling into the level of effectiveness that he showed for the year.

Clemens had a similar experience in 2001. After a sub par beginning in April and May, he rebounded in June with a 2.38 ERA. For the rest of the season, he once again resumed a normal, steady pace of distinctly better-than-average pitching. Although Clemens had posted a higher ERA margin in 2000 and was only 0.96 runs better than the American League's ERA of 4.47 in 2001, the Yankees' hitters produced a prolific 6.6 runs of support per 9 innings. As noted earlier, this played a major role in his amassing a 20-3 won-lost record. One could argue that the Yankees' hitters could have shared in the Cy Young Award that he won that year, just as one could argue that the lack of run support from Boston hitters cost him an opportunity to win the Cy Young Award in 1994.

The 2002 and 2003 Seasons

Chart 22
Monthly Breakdowns for Roger Clemens in 2002 and 2003

Year	Month	G	IP	ERA	H/9	BB/9	BR/9	HR/9	SO/9
2002	April	6	39.0	4.62	7.8	3.5	11.3	0.5	8.8
2002	May	6	39.1	2.97	8.0	3.2	11.2	0.2	10.7
2002	June	5	30.1	5.04	9.2	3.3	12.5	1.5	10.4
2002	July	2	10.0	2.70	4.5	0.9	5.4	1.8	5.4
2002	August	5	31.0	6.10	11.6	3.5	15.1	1.5	9.9
2002	Sept.	5	30.1	3.86	8.0	3.0	11.0	0.9	9.5
Totals		29	180.0	4.35	8.6	3.2	11.8	0.9	9.6

Year	Month	G	IP	ERA	H/9	BB/9	BR/9	HR/9	SO/9
2003	April	5	34.0	3.18	8.5	2.6	11.1	1.1	9.0
2003	May	5	30.1	5.04	10.4	3.3	13.6	0.6	11.0
2003	June	6	42.0	2.79	6.0	1.9	7.9	1.1	9.2
2003	July	5	31.1	5.17	9.8	2.0	11.8	1.4	7.2
2003	August	6	38.0	4.97	9.2	2.8	12.1	1.2	6.6
2003	Sept.	5	30.0	3.30	8.4	2.4	10.8	0.9	5.4
Totals		33	211.2	3.91	8.5	2.5	10.9	1.0	8.1

Summary

Roger Clemens began the 2002 season with a solid first 15 starts, posting a 3.57 ERA and an 8-2 won-lost record through June 9th. At that point, however, his performance took a decided downturn. In the four games and 20.1 innings that he pitched from June 15th through July 2nd, he recorded a 7.08 ERA. He then pitched well in a 5-inning start on July 12th, but he was injured and removed from the game. The Yankees placed him on the disabled list after that start, where he

remained until August 7th. As revealed in the 2002 chart, below, Clemens struggled in August, posting a 6.10 ERA before he returned to form in September and compiled a 3.86 ERA.

Although Clemens's 4.35 ERA for the season was only 0.11 runs better than the American League norm of 4.46, he finished the season with a 13-6 won-lost record, good for a .684 winning percentage. As noted earlier, this was one of three instances in his career in which his ERA Margin and his run support are out of sync with his wins and losses. Clemens received timely support from his Yankees' teammates in 2002. This timely support is in contrast to 1996, when Clemens left six games while the Red Sox were leading, only to have Boston's relief pitching later surrender the lead, resulting in six "no decisions" instead of wins.

In the 2003 chart, Clemens' ERA varied from month to month. Nonetheless, Clemens pitched well in September and finished the season with a 3.91 ERA. This was 0.61 runs better than the A.L. average of 4.52. His won-lost record was 17-9 in 2003, giving him a winning percentage of .654. His improved ERA Margin accounts for a portion of the 154 points by which his win percentage exceeds .500. But more of it is owed to the 5.8 runs of support that he received, which was 9/10 of a run greater than the A.L. average of 4.9.

Houston: The 2004 to 2006 Seasons

Chart 23
Monthly Breakdowns for Roger Clemens in 2004, 2005 and 2006

Year	Month	G	IP	ERA
2004	April	5	32.1	1.95
2004	May	5	32.0	2.81
2004	June	6	38.1	3.05
2004	July	5	33.2	3.21
2004	August	6	36.0	4.25
2004	Sept.	6	42.0	2.57
Totals		33	214.1	2.98

H/9	BB/9	BR/9	HR/9	SO/9
5.8	3.9	9.7	0.8	8.9
7.0	3.4	10.4	0.6	12.4
8.5	4.0	12.4	0.7	7.3
6.4	2.9	9.4	1.1	9.1
9.0	3.3	12.3	0.5	7.8
5.8	2.6	8.4	0.2	9.9
7.1	3.3	10.4	0.6	9.2

Year	Month	G	IP	ERA
2005	April	5	35.0	1.03
2005	May	6	41.0	1.54
2005	June	5	32.0	1.97
2005	July	5	34.0	1.32
2005	August	6	42.1	1.70
2005	Sep/Oct	5	27.0	4.33
Totals		32	211.1	1.87

H/9	BB/9	BR/9	HR/9	SO/9
5.9	2.1	8.0	0.5	9.3
4.8	2.6	7.5	0.2	8.8
7.0	3.4	10.4	0.6	7.9
6.9	2.4	9.3	0.0	6.1
5.1	1.7	6.8	0.6	8.5
10.3	4.3	14.6	1.0	6.0
6.4	2.6	9.1	0.5	7.9

Year	Month	G	IP	ERA
2006	April	dnp	----	-----
2006	May	dnp	----	-----
2006	June	2	11.1	2.38
2006	July	6	36.0	2.00
2006	August	6	39.0	2.54
2006	Sept.	5	27.0	2.33
Totals		19	113.1	2.30

H/9	BB/9	BR/9	HR/9	SO/9
----	----	----	----	----
----	----	----	----	----
7.1	3.2	10.3	0.0	5.6
7.3	1.8	9.0	0.5	8.3
7.8	1.6	9.5	0.9	7.6
5.7	3.7	9.3	0.3	9.7
7.1	2.3	9.4	0.6	8.1

After announcing his retirement to much fanfare during the World Series in 2003 in Florida, Clemens decided to "unretire" and pitch for his hometown Houston Astros. The change to the

National League was good for Clemens. The use of pitch counts and his unique contractual arrangement with the Houston Astros allowed him to avoid some of the fatiguing travel of the regular season and kept him fresh throughout the year. His ERA Margin increased to +1.32, and he compiled an 18-4 record in 2004. For this effort, Clemens received his 7th Cy Young Award.

Clemens' success continued in 2005, as he posted an ERA Margin of +2.35; however, below average run support resulted in a 13-8 record. This lack of run support from the Houston Astros during the 2005 season became one of the selling points used by the Texas Rangers in their efforts to sign Clemens prior to the 2006 season. Attached hereto as Exhibit "A" is a one page report prepared by the Texas Rangers showing that if Clemens had received the run support the Rangers provided their pitchers on the dates of each of Clemens' 2005 starts, he would have had a won-lost record of 24-3 and, in the estimation of the Rangers, would have won an 8th Cy Young Award.

In 2006 Clemens agreed to a contract beginning in June, shortening his season to keep him fresh after his participation in the World Baseball Classic for Team USA during the spring. His ERA Margin for 2006 was +2.19, but due to another year of low run support, he posted only a 7-6 record.

Hall-of-Fame starting pitcher Tom Seaver, in his book "The Art of Pitching", describes "location", "movement", and "speed", in that order, as the most important components of successful pitching. Roger Clemens was fortunate to be a teammate of Seaver in Boston in 1986, and has said that Seaver was an influence on his career. Location is throwing a pitch exactly where a pitcher intends it to go. Movement on a pitch makes it more difficult for a hitter to calculate the path of the ball and to judge its destination relative to the strike zone. Speed is simply velocity as measured in miles per hour. Clemens was on top of his game in Houston because of the excellent downward movement on his deceptive split-finger fastball. While the velocity on his regular fastball was usually in the 90-91 m.p.h. range, as opposed to the mid-90's level that it routinely reached earlier in his career, Clemens' location and movement more than compensated for that decline in speed.

In his 2.6-seasons in Houston, spanning a bit less than 16 months of pitching, he compiled 10 peak months. From April of 2004 through August of 2005, Clemens made 33 starts and pitched 223.2 innings. His ERA for that period was 1.53. And his ERA in the three-plus months from the latter part of June through September of 2006 was 2.30.

Return to New York: The 2007 Season

Chart 24
Monthly Breakdown for Roger Clemens in 2007

Year	Month	G	IP	ERA	H/9	BB/9	BR/9	HR9	SO/9
2007	April	dnp	----	-----	----	----	----	----	----
2007	May	dnp	----	-----	----	----	----	----	----
2007	June	5	23.2	5.32	10.3	3.0	13.3	1.5	8.4
2007	July	6	40.2	3.10	7.3	2.2	9.5	0.2	4.6
2007	August	5	24.2	4.74	10.6	3.2	13.9	1.1	6.9
2007	Sept.	2	10.0	4.50	9.0	3.6	12.6	0.9	5.4
Totals		18	99.0	4.18	9.0	2.8	11.8	0.8	6.2

Summary

Roger Clemens returned to the New York Yankees in 2007 for a shortened season, starting in June.

In his last tune-up in preparation for the major league season, Clemens injured his hamstring, delaying his first start with the Yankees and setting the tone for his 2007 season. The monthly breakdown of that season, displayed above, mirrors his physical status.

By July, Clemens was on track. His hit, walk, and home run rates were all superior to his career averages, giving him a 3.10 ERA and a +1.41 ERA Margin. Unfortunately, he got an average of only 2.7 runs of support per game from Yankees batters in July and had only a 2-2 record to show for the excellent quality of his pitching.

In August and September, Clemens struggled with nagging injuries and was limited to only seven starts. His ERA and rates per 9 innings were all in the average range for the American League.

In the end, Clemens' ERA of 4.18 for the 2007 season was +0.33 runs better than the league average. Given the low level of run support that he received from the Yankees' offense for the season, his won-lost record was only 6-6, making it one of only three seasons in his 24 years in the major leagues in which Clemens and his teammates did not produce a winning record in games that he started.

E. Prime Strikeout Ages of Selected Power-Pitching Starters

Roger Clemens and several notable pitchers have shown the ability to excel at striking out hitters at an older age. The two charts that follow show the year-by-year innings totals and strikeout rates per 9 innings of Roger Clemens, Randy Johnson, Curt Schilling, and Nolan Ryan. Their birth dates are shown after their names. Their statistics are presented year by year and are aligned with the ages displayed in bold numbers in the charts. (The seasonal ages for the players are determined as of June 30th, which is the midpoint of the calendar year and of the major league season.)

The rank column (Rk) includes the top five strikeout rates for each pitcher. Thus, for example, Roger Clemens' highest ranked seasonal strikeout rate of 10.4 came in 1998, which is marked "1st". The age column shows that his age as of June 30th of that year was 35.

Chart 25
The Ages of Roger Clemens, Randy Johnson, and Curt Schilling
When They Recorded Their Top Five Seasonal Strikeout Rates

Roger Clemens: 8/4/62

Randy Johnson: 9/10/63

Curt Schilling: 11/14/66

Year	IP	K/9	Rk	Age	Year	IP	K/9	Rk	Age	Year	IP	K/9	Rk
1984	133.1	8.5		21					21				
1985	98.1	6.8		22					22	1988	14.2	2.5	
1986	254.0	8.4		23					23	1989	8.2	6.2	
1987	281.2	8.2		24	1988	26.0	8.7		24	1990	46.0	6.3	
1988	264.0	9.9	3 rd	25	1989	160.2	7.3		25	1991	75.2	8.4	
1989	253.1	8.2		26	1990	219.2	8.0		26	1992	226.1	5.9	
1990	228.1	8.2		27	1991	201.1	10.2		27	1993	235.1	7.1	
1991	271.1	8.0		28	1992	210.1	10.3		28	1994	82.1	6.3	
1992	246.2	7.6		29	1993	255.1	10.9		29	1995	116.0	8.8	
1993	191.2	7.5		30	1994	172.0	10.7		30	1996	183.1	8.9	
1994	170.2	8.9		31	1995	214.1	12.4	4 th	31	1997	254.1	11.3	1 st
1995	140.0	8.5		32	1996	61.1	12.5	3 rd	32	1998	268.2	10.1	5 th
1996	242.2	9.5	5 th	33	1997	213.0	12.3	5 th	33	1999	180.1	7.6	
1997	264.0	10.0	2 nd	34	1998	244.1	12.1		34	2000	210.1	7.2	
1998	234.2	10.4	1 st	35	1999	271.2	12.1		35	2001	256.2	10.3	4 th
1999	187.2	7.8		36	2000	248.2	12.6	2 nd	36	2002	259.1	11.0	2 nd
2000	204.1	8.3		37	2001	249.2	13.4	1 st	37	2003	168.0	10.4	3 rd
2001	220.1	8.7		38	2002	260.0	11.6		38	2004	226.2	8.1	
2002	180.0	9.6	4 th	39	2003	114.0	9.9		39	2005	93.1	8.4	
2003	211.2	8.1		40	2004	245.2	10.6		40	2006	204.0	8.1	
2004	214.1	9.2		41	2005	225.2	8.4		41	2007	151.0	6.0	
2005	211.1	7.9		42	2006	205.0	7.6		42				
2006	113.1	8.1		43	2007	56.2	11.4		43				
2007	99.0	6.2		44					44				
	Avg.	8.6				Avg.	10.8				Avg.	8.6	

Summary

Roger Clemens had three of his top five seasons in strikeout rate, including his two best, between the ages of 33 and 35. Randy Johnson's top two rates came at ages 36 and 37, and all of his top five occurred in his thirties. As with Johnson, the first of Curt Schilling's top five strikeout rates came at age 31. All of his top five rates occurred from the ages of 31 to 37, with two of his best three coming at ages 36 and 37. It is notable that Johnson's strikeout rate of 10.6 at age 40 is better than any strikeout rate recorded by Clemens in his career. Schilling's third best strikeout rate of 10.4 at age 37, matches Clemens' best strikeout rate, which he posted at the age of 35.

Chart 26
The Ages of Roger Clemens and Nolan Ryan When They Recorded Their Top Five Seasonal Strikeout Rates

Roger Clemens: 8/4/62

Nolan Ryan: 1/16/47

Year	IP	K/9	Rk	Age	Year	IP	K/9	Rk
				19	1966	3.0	18.0	
				20	1967	-----	-----	
1984	133.1	8.5		21	1968	134.0	8.9	
1985	98.1	6.8		22	1969	89.1	9.3	
1986	254.0	8.4		23	1970	131.2	8.5	
1987	281.2	8.2		24	1971	152.0	8.1	
1988	264.0	9.9	3 rd	25	1972	284.0	10.4	5 th
1989	253.1	8.2		26	1973	326.0	10.6	3 rd
1990	228.1	8.2		27	1974	332.2	9.9	
1991	271.1	8.0		28	1975	198.0	8.5	
1992	246.2	7.6		29	1976	284.1	10.4	5 th
1993	191.2	7.5		30	1977	299.0	10.3	
1994	170.2	8.9		31	1978	234.2	10.0	
1995	140.0	8.5		32	1979	222.2	9.0	
1996	242.2	9.5	5 th	33	1980	233.2	7.7	
1997	264.0	10.0	2 nd	34	1981	149.0	8.5	
1998	234.2	10.4	1 st	35	1982	250.1	8.8	
1999	187.2	7.8		36	1983	196.1	8.4	
2000	204.1	8.3		37	1984	183.2	9.7	
2001	220.1	8.7		38	1985	232.0	8.1	
2002	180.0	9.6	4 th	39	1986	178.0	9.8	
2003	211.2	8.1		40	1987	211.2	11.5	1 st
2004	214.1	9.2		41	1988	220.0	9.3	
2005	211.1	7.9		42	1989	239.1	11.3	2 nd
2006	113.1	8.1		43	1990	204.0	10.2	
2007	99.0	6.2		44	1991	173.0	10.6	3 rd
				45	1992	157.1	9.0	
				46	1993	66.1	6.2	
	Avg.	8.6				Avg.	9.6	

Summary

Three of Nolan Ryan’s top five strikeout rates occurred when he was in his forties, with his very best season coming at the age of 40. It should be noted that Roger Clemens has stated for many years that his idol was Nolan Ryan, who had a well-known work ethic somewhat ahead of his time. Roger diligently noted Ryan’s approach to his profession, including his pitching mechanics and workout routine, with a special emphasis on the use of his legs to generate power.

Conclusions

The above charts demonstrate that three of the most accomplished power pitchers in the active major league population, Roger Clemens, Randy Johnson and Curt Schilling, registered all but two of their highest strikeout rates between the ages of 31 and 37. And the pitcher with the highest career strikeout total in history, Nolan Ryan, did not attain his top three rates until after he turned 40.

II. Pitching Quantity

The first section of this report evaluated the quality of Roger Clemens’ pitching over the course of his career. This section will evaluate the quantity of his pitching over his career.

Chart 27
Roger Clemens: Innings per Start and Pitches per Start
1984-2007

Year	Club	G	GS	IP	IP/GS	Pit/GS
1984	Bos	21	20	133.1	6.7	n/a
1985	Bos	15	15	98.1	6.6	n/a
1986	Bos	33	33	254.0	7.7	n/a
1987	Bos	36	36	281.2	7.8	n/a
1988	Bos	35	35	264.0	7.5	119.6
1989	Bos	35	35	253.1	7.2	120.4
1990	Bos	31	31	228.1	7.4	113.2
1991	Bos	35	35	271.1	7.8	115.2
1992	Bos	32	32	246.2	7.7	119.4
1993	Bos	29	29	191.2	6.6	109.3
1994	Bos	24	24	170.2	7.1	120.6
1995	Bos	23	23	140.0	6.1	106.7
1996	Bos	34	34	242.2	7.1	125.3
1997	Tor	34	34	264.0	7.8	120.8
1998	Tor	33	33	234.2	7.1	115.3
1999	NYY	30	30	187.2	6.3	110.9
2000	NYY	32	32	204.1	6.4	107.3
2001	NYY	33	33	220.1	6.7	109.2
2002	NYY	29	29	180.0	6.2	103.3
2003	NYY	33	33	211.2	6.4	104.8
2004	Hou	33	33	214.1	6.5	104.0
2005	Hou	32	32	211.1	6.6	100.1
2006	Hou	19	19	113.1	6.0	96.2
2007	NYY	18	17	99.0	5.8	92.4
Totals		709	707	4916.2		

Injured **Abbreviated Season** **Abbreviated & Injured**

Rk. – Rank in league for Innings Pitched

The most obvious effect of Roger Clemens' loss of playing time to injuries and rookie status is the reduction of his innings pitched. In the 1980s and 1990s, before pitch counts and relief specialists became more in vogue, Clemens typically pitched in the neighborhood of 250 innings in seasons in which he remained healthy.

Clemens maintained nearly the same high level of volume through 1998, except when he was injured in 1993 and 1995 and when seasons were cut short by work stoppages in 1994 and 1995. From 1999 through 2005 his seasonal average dropped to approximately 215 innings pitched per year when he was not on the disabled list. This was due, in part, to Clemens being placed on a pitch count, like most pitchers. Being on a pitch count means that a club will chart the total number of pitches a starting pitcher throws, and when the pitcher reaches a prescribed limit, usually around 100 pitches, the club will consider replacing him in the game with a relief pitcher. This trend has led to an increased emphasis on the quality of relief pitching and has helped preserve the health of starting pitchers, young and old.

By excluding the years in which Clemens suffered from injury, a clear trend emerges in Clemens quantity of starts, innings pitched, innings pitched per start, and pitches per start.

Chart 28
Roger Clemens: Innings per Start
and Pitches per Start in Years Unaffected by Injuries

Year	Club	G	GS	IP	IP/GS	Pit/GS
1984 ¹	Bos	21	20	133.1	6.7	n/a
1986	Bos	33	33	254.0	7.7	n/a
1987	Bos	36	36	281.2	7.8	n/a
1988	Bos	35	35	264.0	7.5	119.6
1989	Bos	35	35	253.1	7.2	120.4
1990	Bos	31	31	228.1	7.4	113.2
1991	Bos	35	35	271.1	7.8	115.2
1992	Bos	32	32	246.2	7.7	119.4
1994 ²	Bos	24	24	170.2	7.1	120.6
1996	Bos	34	34	242.2	7.1	125.3
1997	Tor	34	34	264.0	7.8	120.8
1998	Tor	33	33	234.2	7.1	115.3
2001	NYY	33	33	220.1	6.7	109.2
2003	NYY	33	33	211.2	6.4	104.8
2004	Hou	33	33	214.1	6.5	104.0
2005	Hou	32	32	211.1	6.6	100.1
2006 ³	Hou	19	19	113.1	6.0	96.2
Totals		709	707	4916.2		

Abbreviated Season

- 1 Rookie Season
- 2 MLB work stoppage
- 3 Season shortened by contract

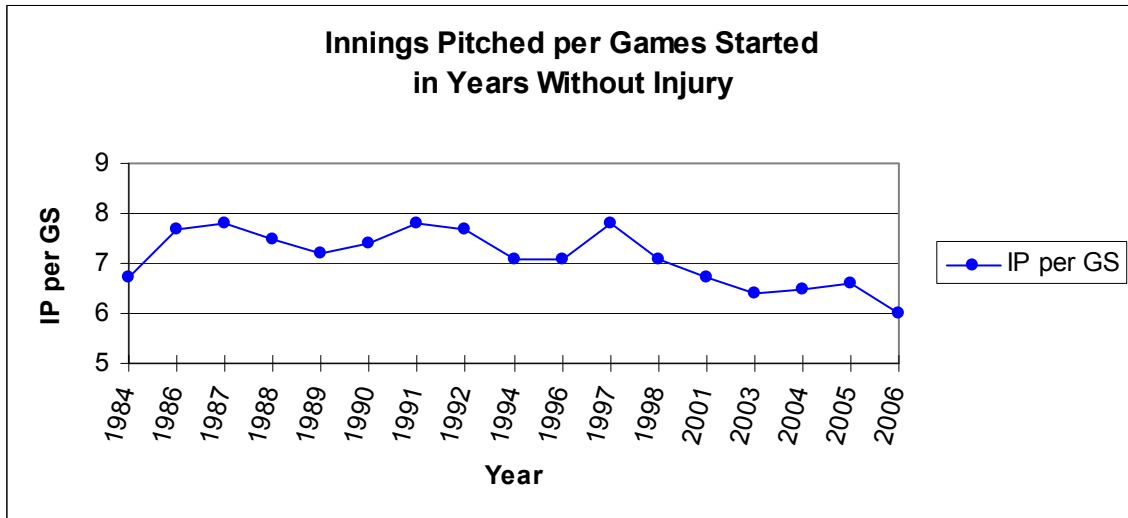
As shown above, there was a decline in the quantity of Clemens' pitching as he got older. This trend is evident in each statistical category. For innings pitched, it is not appropriate to include abbreviated seasons in this analysis as there was a predictable shortfall due to Clemens'

participating in only a partial season. It is appropriate, however, to include the data regarding the rates of innings pitched and pitches per game started, as these rates would not be significantly affected by abbreviated seasons absent an injury.

There was a decline in the total number of innings pitched by Clemens per season. Clemens averaged 254 innings pitched per full season between 1986 and 1998. Between 2001 and 2004, Clemens averaged 214 innings pitched per full season.

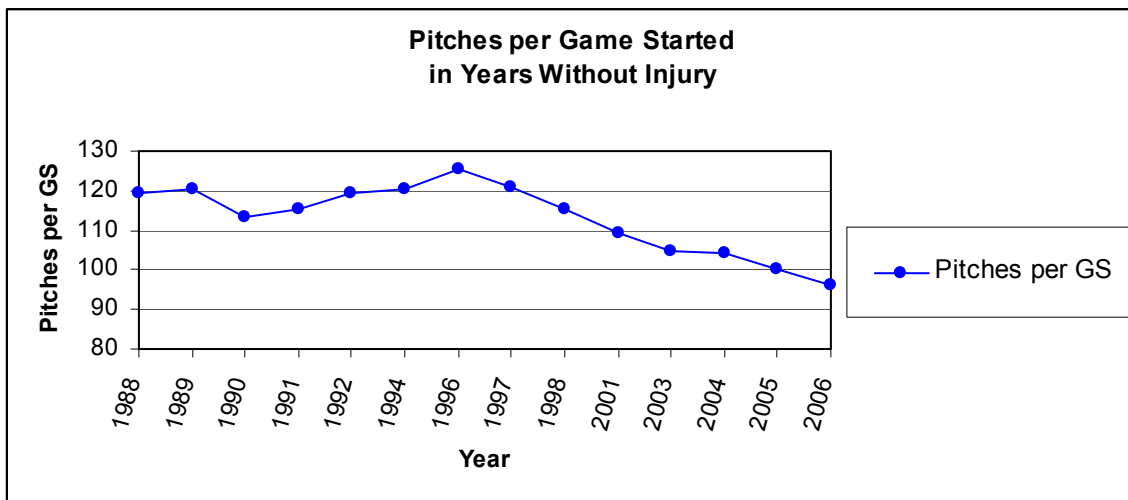
In addition to declines in the innings pitched on a season-by-season basis, as the chart above and the graphs below show, there was also a decline in the quantity of pitching that Clemens was able to provide on a per-start basis as he grew older.

Chart 29



The graph above demonstrates that Clemens averaged between 7.0 and 8.0 innings per start in seasons in which he avoided injury during the early portion of his career. After averaging 7.8 innings per start in his best professional season, 1997, Clemens' rate generally declined with age. 1998 was the last year Clemens averaged more than 7.0 innings per start.

Chart 30



The number of pitches per start is a good measure of the combined effects of declining stamina and pitch-count limitations. Clemens averaged 116.6 pitches per start from 1988 thru 1996. His rate peaked at 125.3 in 1996 when he was 34 years old. After 1997, his pitch count declined in each season, with his rate dropping from 120.8 to 92.4.

It is not unusual for starting pitchers to pitch fewer innings as they get older. By comparing the quantity of pitching of Roger Clemens to those of Randy Johnson, Curt Schilling and Nolan Ryan, it is clear that Clemens' career is consistent with these fine pitchers' careers.

Chart 31
Randy Johnson: Innings per Start and Pitches per Start

Year	Club	G	GS	IP	IP/GS	Pit/GS
1988	Mon	4	4	26.0	6.5	107.3
1989	Mon-Sea	29	28	160.2	5.7	99.3
1990	Sea	33	33	219.2	6.7	112.2
1991	Sea	33	33	201.1	6.1	112.6
1992	Sea	31	31	210.1	6.8	121.8
1993	Sea	35	34	255.1	7.5	123.7
1994	Sea	23	23	172.0	7.5	126.0
1995	Sea	30	30	214.1	7.1	120.7
1996	Sea	14	8	61.1	n/a	104.4
1997	Sea	30	29	213.0	7.3	119.7
1998	Sea-Hou	34	34	244.1	7.2	119.5
1999	Ari	35	35	271.2	7.8	120.2
2000	Ari	35	35	248.2	7.3	115.0
2001	Ari	35	34	249.2	7.3	116.6
2002	Ari	35	35	260.0	7.4	114.2
2003	Ari	18	18	114.0	6.3	100.6
2004	Ari	35	35	245.2	7.0	103.8
2005	NYY	34	34	225.2	6.6	100.8
2006	NYY	33	33	205.0	6.2	98.8
2007	Ari	10	10	56.2	5.7	90.6
Totals		566	556	3855.1		

Abbreviated Season Injured

As with Clemens, Johnson had a decline in his quantity of innings and pitches per game as he got older. From his peak of 7.8 IP per game started and 120.2 pitches per game started in 1999, Johnson pitched less and less with age.

Chart 32
The Ages of Roger Clemens and Randy Johnson When They
Recorded Their Top Five Innings Pitched Per Game Started

Roger Clemens: 8/4/62

Randy Johnson: 9/10/63

Year	GS	IP	IP/GS	Rk	Age	Year	GS	IP	IP/GS	Rk	
1984	20	133.1	6.7		21						
1985	15	98.1	6.6		22						
1986	33	254.0	7.7	2 ^{tie}	23						
1987	36	281.2	7.8	1 ^{tie}	24	1988	4	26.0	6.5		
1988	35	264.0	7.5		25	1989	28	160.2	5.7		
1989	35	253.1	7.2		26	1990	33	219.2	6.7		
1990	31	228.1	7.4		27	1991	33	201.1	6.1		
1991	35	271.1	7.8	1 ^{tie}	28	1992	31	210.1	6.8		
1992	32	246.2	7.7	2 ^{tie}	29	1993	34	255.1	7.5		2 ^{tie}
1993	29	191.2	6.6		30	1994	23	172.0	7.5		2 ^{tie}
1994	24	170.2	7.1		31	1995	30	214.1	7.1		
1995	23	140.0	6.1		32	1996	8	61.1	n/a		
1996	34	242.2	7.1		33	1997	29	213.0	7.3		5 ^{tie}
1997	34	264.0	7.8	1 ^{tie}	34	1998	34	244.1	7.2		
1998	33	234.2	7.1		35	1999	35	271.2	7.8	1 st	
1999	30	187.2	6.3		36	2000	35	248.2	7.3	5 ^{tie}	
2000	32	204.1	6.4		37	2001	34	249.2	7.3	5 ^{tie}	
2001	33	220.1	6.7		38	2002	35	260.0	7.4	4 th	
2002	29	180.0	6.2		39	2003	18	114.0	6.3		
2003	33	211.2	6.4		40	2004	35	245.2	7.0		
2004	33	214.1	6.5		41	2005	34	225.2	6.6		
2005	32	211.1	6.6		42	2006	33	205.0	6.2		
2006	19	113.1	6.0		43	2007	10	56.2	5.7		
2007	17	99.0	5.8		44						
Totals	707						556				

As shown in the chart above, Johnson maintained his innings per game started at high levels for longer than Clemens, posting several of his best seasons after the age of 35.

Chart 33
The Ages of Roger Clemens and Randy Johnson When They Recorded Their Top Five Pitches per Game Started

Roger Clemens: 8/4/62

Randy Johnson: 9/10/63

Year	GS	IP	Pit/GS	Rk	Age	Year	GS	IP	Pit/GS	Rk
1984	20	133.1	n/a		21					
1985	15	98.1	n/a		22					
1986	33	254.0	n/a		23					
1987	36	281.2	n/a		24	1988	4	26.0	107.3	
1988	35	264.0	119.6	5 th	25	1989	28	160.2	99.3	
1989	35	253.1	120.4	4 th	26	1990	33	219.2	112.2	
1990	31	228.1	113.2		27	1991	33	201.1	112.6	
1991	35	271.1	115.2		28	1992	31	210.1	121.8	3 rd
1992	32	246.2	119.4		29	1993	34	255.1	123.7	2 nd
1993	29	191.2	109.3		30	1994	23	172.0	126.0	1 st
1994	24	170.2	120.6	3 rd	31	1995	30	214.1	120.7	4 th
1995	23	140.0	106.7		32	1996	8	61.1	104.4	
1996	34	242.2	125.3	1 st	33	1997	29	213.0	119.7	
1997	34	264.0	120.8	2 nd	34	1998	34	244.1	119.5	
1998	33	234.2	115.3		35	1999	35	271.2	120.2	5 th
1999	30	187.2	110.9		36	2000	35	248.2	115.0	
2000	32	204.1	107.3		37	2001	34	249.2	116.6	
2001	33	220.1	109.2		38	2002	35	260.0	114.2	
2002	29	180.0	103.3		39	2003	18	114.0	100.6	
2003	33	211.2	104.8		40	2004	35	245.2	103.8	
2004	33	214.1	104.0		41	2005	34	225.2	100.8	
2005	32	211.1	100.1		42	2006	33	205.0	98.8	
2006	19	113.1	96.2		43	2007	10	56.2	90.6	
2007	17	99.0	92.4		44					
Totals	707						556			

As with innings per game, Johnson's number of pitches per game declined with age, but he maintained high pitch counts for slightly longer than Clemens at comparable ages. After the 1999 season, Johnson showed a decline in pitches per game started.

Chart 34
Curt Schilling: Innings per Start and
Pitches per Start

Year	Club	G	GS	IP	IP/GS	Pit/GS
1988	Bal	4	4	14.2	3.7	71.3
1989	Bal	5	1	8.2	2.1	57.0
1990	Bal	35	0	46.0	--	--
1991	Hou	56	0	75.2	--	--
1992	Phi	42	26	226.1	7.6	108.3
1993	Phi	34	34	235.1	6.9	107.5
1994	Phi	13	13	82.1	6.3	102.2
1995	Phi	17	17	116.0	6.8	106.6
1996	Phi	26	26	183.1	7.1	109.2
1997	Phi	35	35	254.1	7.3	118.1
1998	Phi	35	35	268.2	7.7	120.4
1999	Phi	24	24	180.1	7.5	110.9
2000	Phi-Ari	29	29	210.1	7.3	105.8
2001	Ari	35	35	256.2	7.3	106.0
2002	Ari	36	35	259.1	7.4	105.9
2003	Ari	24	24	168.0	7.0	102.3
2004	Bos	32	32	226.2	7.1	106.6
2005	Bos	32	11	93.1	6.3	104.6
2006	Bos	31	31	204.0	6.6	104.8
2007	Bos	24	24	151.0	6.3	94.8
Totals		569	436	3261.0		

Abbreviated Season & Injured **Injured**

Schilling pitched his highest number of innings and pitches per game in the 1998 season. Since 1998, his quantity has declined in both categories.

Chart 35
The Ages of Roger Clemens and Curt Schilling When They
Recorded Their Top Five Innings Pitched per Game Started

Roger Clemens: 8/4/62

Curt Schilling: 11/14/66

Year	GS	IP	IP/GS	Rk	Age	Year	GS	IP	IP/GS	Rk
1984	20	133.1	6.7		21					
1985	15	98.1	6.6		22					
1986	33	254.0	7.7	4 ^{tie}	23					
1987	36	281.2	7.8	1 ^{tie}	24	1988	4	14.2	3.7	
1988	35	264.0	7.5		25	1989	1	8.2	2.1	
1989	35	253.1	7.2		26	1990	0	46.0	--	
1990	31	228.1	7.4		27	1991	0	75.2	--	
1991	35	271.1	7.8	1 ^{tie}	28	1992	26	226.1	7.6	
1992	32	246.2	7.7	4 ^{tie}	29	1993	34	235.1	6.9	
1993	29	191.2	6.6		30	1994	13	82.1	6.3	
1994	24	170.2	7.1		31	1995	17	116.0	6.8	
1995	23	140.0	6.1		32	1996	26	183.1	7.1	
1996	34	242.2	7.1		33	1997	35	254.1	7.3	4 ^{tie}
1997	34	264.0	7.8	1 ^{tie}	34	1998	35	268.2	7.7	1 st
1998	33	234.2	7.1		35	1999	24	180.1	7.5	2 nd
1999	30	187.2	6.3		36	2000	29	210.1	7.3	4 ^{tie}
2000	32	204.1	6.4		37	2001	35	256.2	7.3	4 ^{tie}
2001	33	220.1	6.7		38	2002	35	259.1	7.4	3 rd
2002	29	180.0	6.2		39	2003	24	168.0	7.0	
2003	33	211.2	6.4		40	2004	32	226.2	7.1	
2004	33	214.1	6.5		41	2005	11	93.1	6.3	
2005	32	211.1	6.6		42	2006	31	204.0	6.6	
2006	19	113.1	6.0		43	2007	24	151.0	6.3	
2007	17	99.0	5.8		44					
Totals	707						436			

As shown in the chart above, Schilling had his highest rates of innings per game started between the ages of 33 and 38. He maintained a rate of more than 7.0 innings per game started until the age of 40. Clemens did not average more than 7.0 innings per game started after the age of 35.

Chart 36
The Ages of Roger Clemens and Curt Schilling When
They Recorded Their Top Five Pitches per Game Started

Roger Clemens: 8/4/62

Curt Schilling: 11/14/66

Year	GS	IP	Pit/GS	Rk	Age	Year	GS	IP	Pit/GS	Rk
1984	20	133.1	n/a		21					
1985	15	98.1	n/a		22					
1986	33	254.0	n/a		23					
1987	36	281.2	n/a		24	1988	4	14.2	71.3	
1988	35	264.0	119.6	5 th	25	1989	1	8.2	57.0	
1989	35	253.1	120.4	4 th	26	1990	0	46.0	--	
1990	31	228.1	113.2		27	1991	0	75.2	--	
1991	35	271.1	115.2		28	1992	26	226.1	108.3	5 th
1992	32	246.2	119.4		29	1993	34	235.1	107.5	
1993	29	191.2	109.3		30	1994	13	82.1	102.2	
1994	24	170.2	120.6	3 rd	31	1995	17	116.0	106.6	
1995	23	140.0	106.7		32	1996	26	183.1	109.2	4 th
1996	34	242.2	125.3	1 st	33	1997	35	254.1	118.1	2 nd
1997	34	264.0	120.8	2 nd	34	1998	35	268.2	120.4	1 st
1998	33	234.2	115.3		35	1999	24	180.1	110.9	3 rd
1999	30	187.2	110.9		36	2000	29	210.1	105.8	
2000	32	204.1	107.3		37	2001	35	256.2	106.0	
2001	33	220.1	109.2		38	2002	35	259.1	105.9	
2002	29	180.0	103.3		39	2003	24	168.0	102.3	
2003	33	211.2	104.8		40	2004	32	226.2	106.6	
2004	33	214.1	104.0		41	2005	11	93.1	104.6	
2005	32	211.1	100.1		42	2006	31	204.0	104.8	
2006	19	113.1	96.2		43	2007	24	151.0	94.8	
2007	17	99.0	92.4		44					
Totals	707						436			

The pitch counts of Curt Schilling and Roger Clemens follow a similar pattern of decline after age 34. Both men peaked between the ages of 33 and 34 and underwent declines in pitches per game started for the rest of their careers.

Chart 37
Nolan Ryan: Innings per Start

Year	Club	G	GS	IP	IP/GS
1966	NYM	2	1	3.0	n/a
1968	NYM	21	18	134.0	n/a
1969	NYM	25	10	89.1	n/a
1970	NYM	27	19	131.2	n/a
1971	NYM	30	26	152.0	n/a
1972	Cal	39	39	284.0	7.3
1973	Cal	41	39	326.0	8.4
1974	Cal	42	41	332.2	8.1
1975	Cal	28	28	198.0	7.1
1976	Cal	39	39	284.1	7.3
1977	Cal	37	37	299.0	8.1
1978	Cal	31	31	234.2	7.6
1979	Cal	34	34	222.2	6.5
1980	Hou	35	35	233.2	6.7
1981	Hou	21	21	149.0	7.1
1982	Hou	35	35	250.1	7.2
1983	Hou	29	29	196.1	6.8
1984	Hou	30	30	183.2	6.1
1985	Hou	35	35	232.0	6.6
1986	Hou	30	30	178.0	5.9
1987	Hou	34	34	211.2	6.2
1988	Hou	33	33	220.0	6.7
1989	Tex	32	32	239.1	7.5
1990	Tex	30	30	204.0	6.8
1991	Tex	27	27	173.0	6.4
1992	Tex	27	27	157.1	5.8
1993	Tex	13	13	66.1	5.1
Totals		807	773	5386.0	

Injured **Abbreviated Season**
n/a – pitcher had significant relief appearances

Analyzing Nolan Ryan's quantity over the course of his career is helpful because he has one of the longest careers for a starting pitcher in the history of baseball. Pitch count information is unavailable prior to 1988, so Ryan's quantity must be measured in innings per game started. As displayed in the chart above, Ryan was able to average more than 8.0 innings per start three

times in his career. After 1982, Ryan consistently pitched less than 7.0 innings per game started, with exception of his 7.5 rate in 1989.

Chart 38
The Ages of Roger Clemens and Nolan Ryan When They
Recorded Their Top Five Innings Pitched per Game Started

Roger Clemens: 8/4/62

Nolan Ryan: 1/16/47

Year	GS	IP	IP/GS	Rk	Age	Year	GS	IP	IP/GS	Rk
					19	1966	1	3.0	n/a	
					20	1967	0	0.0	n/a	
1984	20	133.1	6.7		21	1968	18	134.0	n/a	
1985	15	98.1	6.6		22	1969	10	89.1	n/a	
1986	33	254.0	7.7	4 th	23	1970	19	131.2	n/a	
1987	36	281.2	7.8	1 st	24	1971	26	152.0	n/a	
1988	35	264.0	7.5		25	1972	39	284.0	7.3	
1989	35	253.1	7.2		26	1973	39	326.0	8.4	1 st
1990	31	228.1	7.4		27	1974	41	332.2	8.1	2 nd
1991	35	271.1	7.8	1 st	28	1975	28	198.0	7.1	
1992	32	246.2	7.7	4 th	29	1976	39	284.1	7.3	
1993	29	191.2	6.6		30	1977	37	299.0	8.1	2 nd
1994	24	170.2	7.1		31	1978	31	234.2	7.6	4 th
1995	23	140.0	6.1		32	1979	34	222.2	6.5	
1996	34	242.2	7.1		33	1980	35	233.2	6.7	
1997	34	264.0	7.8	1 st	34	1981	21	149.0	7.1	
1998	33	234.2	7.1		35	1982	35	250.1	7.2	
1999	30	187.2	6.3		36	1983	29	196.1	6.8	
2000	32	204.1	6.4		37	1984	30	183.2	6.1	
2001	33	220.1	6.7		38	1985	35	232.0	6.6	
2002	29	180.0	6.2		39	1986	30	178.0	5.9	
2003	33	211.2	6.4		40	1987	34	211.2	6.2	
2004	33	214.1	6.5		41	1988	33	220.0	6.7	
2005	32	211.1	6.6		42	1989	32	239.1	7.5	5 th
2006	19	113.1	6.0		43	1990	30	204.0	6.8	
2007	17	99.0	5.8		44	1991	27	173.0	6.4	
					45	1992	27	157.1	5.8	
					46	1993	13	66.1	5.1	
Totals	707					Totals	773			

n/a – pitcher had significant relief appearances

Ryan pitched more than 8.0 innings per start in several seasons during the 1970's, a feat unlikely to be repeated by a pitcher in the modern era given the increased use of relief specialists and pitch counts in today's game. While Clemens never reached an average of 8.0 innings per start, Ryan and Clemens both generally averaged more than 7.0 innings per start until the age of 35.

Summary of Quantity

Roger Clemens' pitching career shows a decline in quantity over time. As demonstrated above, after the 1996 and 1997 seasons, Clemens pitched fewer innings per season as he aged. Moreover, this decline in Clemens' quantity is also seen in his innings and pitches per game.

Conclusion

Over the course of his career, Roger Clemens was able to maintain a high quality of pitching by continuing to work on his technique and adjusting his style of pitching to his physical abilities. Had he not mastered the split-finger fastball, it is unlikely that he would have maintained the high level of effectiveness that he displayed during his 24 years on the mound. If pitchers cannot adapt to changing circumstances and maintain the quality of their pitching, then they tend to retire or to be replaced. Therefore, one would expect that any pitcher who has a long career would continue to pitch well late in life, as Clemens, Randy Johnson, Curt Schilling and Nolan Ryan did.

Clemens' ERA Margin and strikeout rates were extremely good by any measure. But like all pitchers, Clemens had hot streaks and cold spells, as well as good seasons and bad seasons, over the course of his career. Some mistakenly view 1996 as a down season because of his 10-13 won-lost record, when in fact Clemens had an excellent season, leading the American League in strikeouts and posting an excellent ERA Margin of +1.37. In fact, 1996 began the best period of pitching in Clemens' career, a period that would continue until he suffered an injury in the beginning of 1999.

While Clemens maintained high performance quality throughout his career, the quantity of his pitching declined as he aged. Reducing the amount that Clemens pitched through the use of pitch counts, and contractually shortening the 2006 and 2007 seasons, contributed to his ability to continue to pitch at a high level by preserving his stamina. The reduction of travel to avoid fatigue also helped Clemens continue to pitch well later in his career.

Finally, it is noteworthy that the following Hall-of-Fame pitchers pitched into their 40's:

Alexander, Grover 43 years old	Paige, Satchel 46
Bender, Chief 41	Pennock, Herb 40
Brown, Mordecai 40	Perry, Gaylord 45
Bunning, Jim 40	Plank, Eddie 42
Carlton, Steve 44	Rixey, Eppa 42
Eckersley, Dennis 44	Roberts, Robin 40
Faber, Red 45	Ruffing, Red 43
Gibson, Bob 40	Ryan, Nolan 46
Grimes, Burliegh 41	Seaver, Tom 42
Grove, Lefty 41	Spahn, Warren 44
Haines, Jesse 44	Sutton, Don 43
Hubbell, Carl 40	Vance, Dazzy 44
Jenkins, Fergie 40	Wilhelm, Hoyt 49
Johnson, Walter 40	Wynn, Early 43
Lyons, Ted 46	Young, Cy 44
Niekro, Phil 48	

Randal A. Hendricks

Randy Hendricks has been a player representative since 1971, prior to free agency in professional sports. He is a veteran of many record setting contracts and has played a substantial role in other important matters in the baseball industry. He holds the best lifetime winning percentage in salary arbitration and collusion cases. He has argued over 60 such cases. He has been ranked near the top of Baseball America power brokers and has been named its top agent. He has been named to the Sporting News list of the 100 Most Powerful People in Sports.

Hendricks served as a member of the Houston/Harris County Sports Facility Public Advisory Committee, which led to new baseball, football and basketball arenas in Houston.

Hendricks authored "Inside the Strike Zone", an intimate look at the inner workings of baseball at the highest levels, published in 1994.

Randy has been a member of ten Major/Major Plus Division national and world championship senior softball teams, including most recently in 2007. He is a member of the Senior Softball Hall of Fame.

Hendricks received a Bachelor of Science degree in Finance, with honors, from the University of Houston. He also received a Doctor of Jurisprudence degree, with honors, from the University of Houston, where he was Articles Editor of the Houston Law Review. He practiced law with the national firm of Baker & Botts before founding Hendricks Sports Management.

Stephen L. Mann

Stephen Mann is Director of Player Evaluation at Hendricks Sports Management. He first was employed by the Houston Astros in 1979 and 1980 as a statistical analyst. In 1980 and 1981, Mann spearheaded the construction of a play-by-play computer system for the Oakland Athletics. Four years later, he designed and directed the development of a more comprehensive software system for the Atlanta Braves and the Philadelphia Phillies.

After working for club management in the salary arbitration arena with Tal Smith Enterprises from 1982 through 1986, Steve joined Hendricks Sports Management in representing players in 1988. In his 25 years as an arbitration advocate, he has played a substantial role in the design and delivery of 55 arbitration cases. He also assisted in the preparation and presentation of 74 damage claims and more than 20 appeals in the collusion damage claims process.

Mann is the author of seven baseball statistics books, five of them published by Harper-Collins, the other two by McGraw-Hill and The Sporting News.

Steve played freshman soccer and freshman and varsity baseball at the University of Pennsylvania. He then served in the United States Army as a motion picture photographer in 1968 and 1969.

Mann earned a Bachelor of Arts in International Relations at the University of Pennsylvania in 1968. He served for two years (1970-72) as an Assistant Director of Undergraduate Admissions at Penn. He earned a doctoral degree in educational philosophy at Temple University in 1980, where he was twice elected president of the graduate student government. He has also served as the ombudsman for the 7,700 administrators, faculty members, and students of Temple's College of Education, which at the time was the nation's largest education school.

Bret R. Larson-Hendricks

Bret Larson-Hendricks began working for Hendricks Sports Management on arbitration and collusion cases in the 1990's. He joined the firm full time as counsel and as a player representative in 2005. Bret previously worked as a defense attorney in civil litigation in Houston, and was admitted to practice in both state and federal court, including the United States Court of Appeals for the Fifth Circuit.

Bret earned a black belt in the martial arts sport of Tae Kwon Do.

Bret was Texas state debate champion and a recognized top national debater in high school at The Kinkaid School in Houston. He graduated magna cum laude from the University of Houston with a Bachelor of Arts degree in History. He later received his Doctor of Jurisprudence degree from the University of Houston, where he was inducted into the Order of the Barristers, a distinction reserved for the top advocates in law school.

Exhibit "A"

HOW WOULD ARLINGTON HAVE TREATED ROGER CLEMENS IN 2005?

DATE	W-L RECORD		HOUSTON	TEXAS
April 8	1-0	1-0	W, 3-2 vs. CIN	L, 6-9 at SEA
April 13	1-0	2-0	L, 0-1 at NYM	W, 7-5 vs. LAA
April 18	1-0	3-0	L, 0-1 vs. ATL	L, 5-8 vs. OAK
April 23	1-0	4-0	L, 0-1 at STL	W, 10-2 at NYY
April 29	1-1	5-0	L, 2-3 vs. CHC	W, 7-2 vs. BOS
May 4	1-1	6-0	L, 4-6 vs. PIT	W, 16-7 at OAK
May 9	2-1	6-0	W, 2-1 at FLA	L, 0-2 vs. DET
May 14	3-1	7-0	W, 4-1 vs. SF	W, 5-0 at MIN
May 19	3-2	8-0	L, 1-6 at ARI	W, 7-3 vs. HOU (5/20)
May 24	3-2	8-0	L, 2-4 at CHC	W, 4-3 vs. KC
May 30	3-3	9-0	L, 0-9 vs. CIN	W, 12-4 vs. CWS (5/28)
June 5	4-3	10-0	W, 6-4 vs. STL	W, 8-1 at KC
June 11	4-3	11-0	W, 6-3 vs. TOR	L, 5-6 at FLA
June 17	5-3	12-0	W, 7-0 at KC	W, 8-1 vs. WAS
June 22	6-3	12-1	W, 6-2 vs. COL	L, 0-6 at LAA
June 28	6-3	12-1	L, 5-6 at COL	L, 1-5 vs. LAA
July 3	7-3	13-1	W, 9-0 at CIN	L, 1-2 at SEA
July 8	7-3	14-1	W, 3-2 vs. LA	W, 7-6 vs. TOR
July 17	7-4	14-1	L, 0-3 at STL	L, 4-5 at OAK
July 22	8-4	15-1	W, 14-1 at WAS	L, 10-11 vs. OAK
July 27	9-4	16-1	W, 3-2 vs. PHI	W, 11-8 at BAL
August 2	10-4	17-1	W, 3-1 at ARI	L, 8-10 at TB
August 7	11-4	18-1	W, 8-1 at SF	W, 9-3 vs. BAL
August 13	11-4	19-1	L, 0-1 vs. PIT	L, 5-7 at NYY
August 18	11-5	19-2	L, 2-5 vs. MIL	L, 4-9 at CLE
August 23	11-6	20-2	L, 0-2 at SD	W, 6-4 vs. SEA
August 28	11-6	20-2	L, 0-1 at LA	W, 2-1 vs. MIN
September	11-6	21-2	L, 2-4 vs. STL	W, 5-3 vs. KC
September	11-7	21-3	L, 4-7 at MIL	L, 8-9 vs. OAK
September	12-7	22-3	W, 10-2 vs. FLA	W, 7-6 vs. BAL
September	12-8	23-3	L, 0-7 at PIT	W, 8-6 vs. SEA (9/18)
October 1	13-8	24-3	W, 3-1 vs. CHC	L, 6-7 vs. LAA

WITH THE RANGERS, ROGER CLEMENS WOULD HAVE GONE 24-3 WITH A 1.87 ERA, EARNING HIS UNPRECEDENTED 8TH CY YOUNG AWARD.

	Run Support for Clemens	Run Support per 9 IP
Houston	84	4.32 (23rd in MLB)
TEXAS	148	5.41 (3rd in MLB)

Among starters with the most run support in all of MLB, the Rangers had two of the top ten (Rogers 2nd, Young 8th).