TABLE E-1 Steinberg Classification

Stage	Criteria
0	Normal radiograph, bone scan, MRI
I	Normal radiograph, abnormal MRI. Size A: <15% of articular surface affected; B: 15% -30%; C: >30%
II	Cystic and sclerotic changes in the femoral head; sizes A,B,C
III	Subchondral collapse producing crescent sign; sizes A,B,C
IV	Partial collapse of the femoral head. Size A: <15% and <2mm depression, B: 15%-30% or 2-4-mm depression, C: >30%
V	Joint narrowing or articular changes, or both
VI	Advanced degenerative changes

TABLE E-2 Scoring System of Merle D'Aubigné and Postel

Score	Pain	Mobility	Ability to walk
0	Pain is intense and permanent	Ankylosis	None
1	Pain is severe even at night	No movement	Only with crutches
2	Pain is severe when walking	Flexion <40°	Only with canes
3	Pain is tolerable with limited activity	Flexion from 40° to 60°	With one cane, less than one hour; very difficult without a cane
4	Pain is mild when walking	Flexion from 60° to 80°	A long time with a cane; short time without cane and with limp
5	Pain is mild and inconstant	Flexion from 80° to 90°; abduction of at least	Without cane but with slight limp
6	No pain	Flexion of >90°; abduction to 30°	Normal

TABLE E-3 Clinical Data on Twenty-one Patients

Case	Age/ Gender	Hip	Etiology	Diagnosis*	Follow-up (months)	Merle D'Aubigné Score								Flexion (°)		Abduction (°)		ADL Score	
						Before Surgery				Final Follow-up				Before Surgery	Final Follow-up	Before Surgery	Final Follow-up	Before Surgery	Final Follow-up
						Pain	Gait	Mobility	Total	Pain	Gait	Mobility	Total						
1	31/F	R	steroid	SLE	101	3	1	6	10	6	2	3	11	90	60	35	20	12	16
2	16/F	L	steroid	SLE	80	2	1	5	8	6	5	5	16	90	90	15	15	11	18
	19/F	R			49	3	1	5	9	5	5	5	15	90	90	15	15	16	18
3	36/F	L	steroid	SLE	74	0	3	6	9	6	6	6	18	120	100	40	30	14	20
4	32/M	R	steroid	SLE	73	3	2	4	9	5	2	3	10	65	45	40	15	18	18
5	28/M	L	steroid	non-SLE	68	3	5	4	12	6	5	4	15	80	70	10	15	20	17
6	26/F	R	steroid	SLE	68	2	2	4	8	5	2	4	11	80	70	20	20	12	14
	28/F	L			34	5	4	6	15	5	4	5	14	120	100	45	25	12	14
7	35/F	R	steroid	non-SLE	61	4	2	6	12	5	5	5	15	120	110	30	25	14	18
8	26/F	L	steroid	non-SLE	59	3	5	6	14	6	6	5	17	110	85	40	20	20	20
9	28/M	R	steroid	non-SLE	56	4	5	5	14	6	5	5	16	90	90	20	25	16	18
	30/M	L			26	4	5	4	13	6	5	4	15	70	70	15	20	14	18
10	39/F	R	steroid	SLE	53	3	1	5	9	5	2	4	11	90	70	35	15	12	16
11	28/F	R	steroid	SLE	47	3	1	6	10	6	6	6	18	120	100	30	30	4	18
	29/F	L			36	3	4	6	13	5	5	5	15	110	80	35	25	10	18
12	32/F	L	steroid	SLE	45	3	1	5	9	6	6	6	18	80	120	20	20	18	18
13	21/F	L	steroid	SLE	44	3	5	6	14	5	5	5	15	90	80	35	20	18	18
14	36/M	R	alcohol		44	3	5	5	13	5	5	5	15	100	90	20	30	18	18
15	28/F	L	steroid	SLE	41	2	1	6	9	6	2	5	13	110	100	30	20	8	16
16	25/F	L	steroid	non-SLE	31	2	1	6	9	6	3	5	14	135	90	45	10	12	14
17	33/F	L	steroid	SLE	30	2	3	4	9	5	3	5	13	60	80	30	20	6	14
18	37/F	L	steroid	SLE	29	4	4	6	14	6	5	6	17	100	110	45	30	16	20
19	18/F	R	steroid	SLE	27	2	5	6	13	6	6	6	18	100	110	60	30	12	20
20	38/M	L	alcohol		25	4	4	6	14	6	5	5	16	100	85	30	30	20	20
21	26/F	L	steroid	SLE	24	4	4	5	13	5	5	6	16	90	90	20	35	16	20

*SLE = Systemic lupus erythematosus

TABLE E-4 Radiographic Data on 21 Patients

Case	Steinberg Stage at Surgery	Extent of Necrosis (°)	Femoral Head Before Surgery (mm)	Femoral Head Coverage		Lateral head index (LHI) After Surgery	Progression of Collapse After Surgery	Narrowing of Joint Space After Surgery
				At Surgery	After Surgery			
1	IV-C	250	3	1.3	0.9	20.7	<2	(+)
2	IV-C	320	4	0.8	0.7	30.1	(-)	(-)
	IV-C	325	8	1	0.7	37.9	(-)	(+)
3	V-C	201	3	1.1	0.8	38.6	(-)	(-)
4	IV-C	298	4	1.2	1	11.9	4	(+)
5	V-C	208	6	0.9	0.7	18.6	(-)	(-)
6	IV-C	464	11	1.9	1	20.5	(-)	(+)
	IV-B	177	2	0.8	0.7	52.7	<2	(+)
7	IV-C	200	3	1.2	0.7	34.7	(-)	(+)
8	IV-C	190	2	0.7	0.5	46.7	(-)	(-)
9	IV-B	204	2	1.1	1	29.8	(-)	(+)
	IV-C	171	3	0.8	0.7	30.7	(-)	(+)
10	IV-B	230	2	0.8	0.5	64.5	<2	(-)
11	IV-C	230	3	0.9	0.7	32.4	(-)	(+)
	IV-C	250	6	1.1	0.8	28.3	(-)	(-)
12	IV-C	236	6	1	0.8	34.7	(-)	(-)
13	V-C	253	5	1.2	0.8	35.4	(-)	(-)
14	IV-C	180	4	1.1	0.7	24.4	<2	(-)
15	IV-B	200	3	0.8	0.7	44.6	(-)	(-)
16	IV-C	210	3	1	0.8	26.2	<2	(-)
17	IV-C	215	3	1	0.8	23	<2	(+)
18	IV-C	307	4	1	0.7	35.1	(-)	(+)
19	IV-C	240	5	0.8	0.6	32.1	(-)	(-)
20	V-C	198	4	0.9	0.8	52.5	(-)	(-)
21	IV-C	200	4	0.9	0.8	36	(-)	(-)