

## XII. Head MRI Measurements

MRI was performed on a 1.5T Toshiba instrument (VISART). The scanning protocol included a series of axial T1-(TR500, TE15) and T2-weighted(TR4000, TE120) scans angled parallel to the anterior-posterior commissure line .

### 1) Brain atrophy

Divided into 4 classes according to an appendix1.

### 2) Ventricular dilatation

Divided into 4 classes according to an appendix2.

### 3) Periventricular hyperintensity

Divide into 4 classes according to an appendix3.

### 4) Cerebrovascular disease

#### Cerebral infarction

Border zone

Include cerebral cortex

White matter

Basal ganglia, thalamus, internal capsule, midbrain, pons, medulla oblongata

Cerebellar white matter, cerebellar cortex

Decided as following,

Lacuna : The lesions of white matter, basal ganglia, thalamus, internal capsule, midbrain, pons, medulla oblongata and whose size are larger than or equal to 3mm and smaller than or equal to 15mm.

Embolism : Include cerebral or cerebellar cortex, and which is not border zone infarction.

Thrombosis : Other than above.

#### Cerebral hemorrhage

On T2 weighted image(WI), hyperintensity inside the lesion and no signal around the lesion. Or on T2WI no signal slit lesion.

## References

Stroke 1994 vol25, p318-327

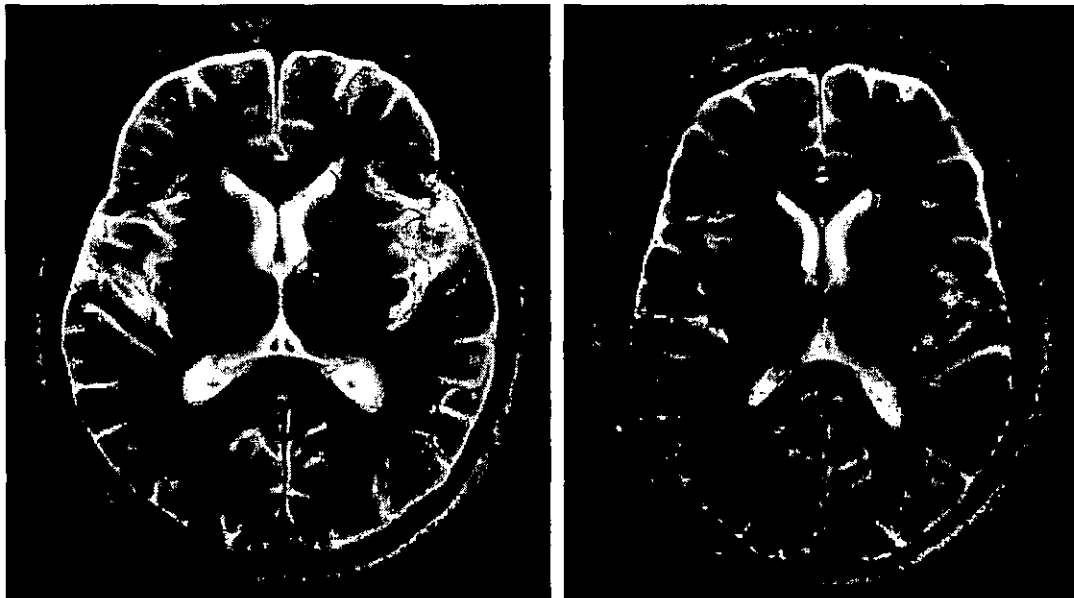
Naika 1997 vol79 (4)

Nihon naika gakkaiishi 1997 vol86

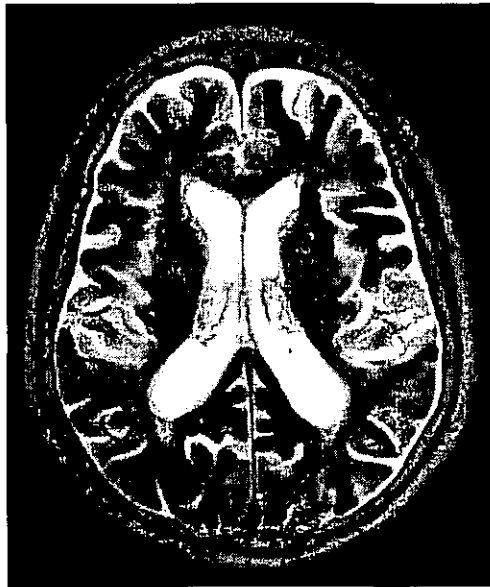
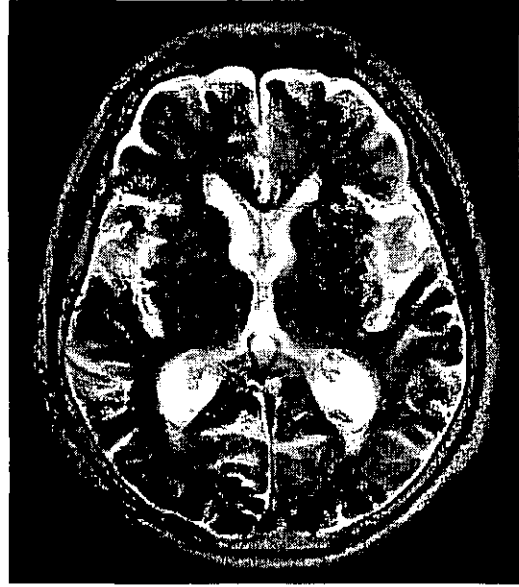
Medicina 1994 vol31 (8)

## Periventricular hyperintensity

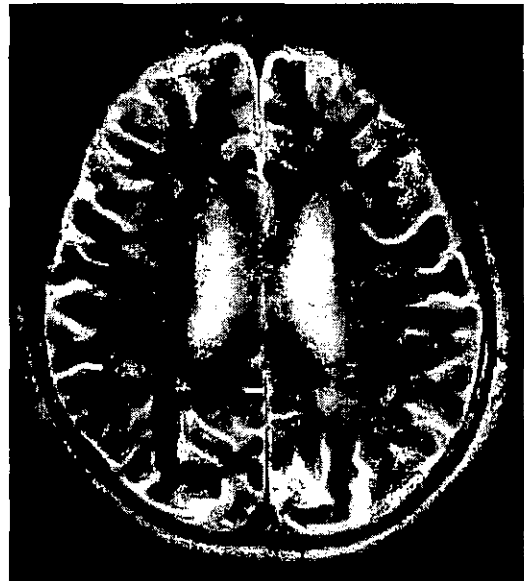
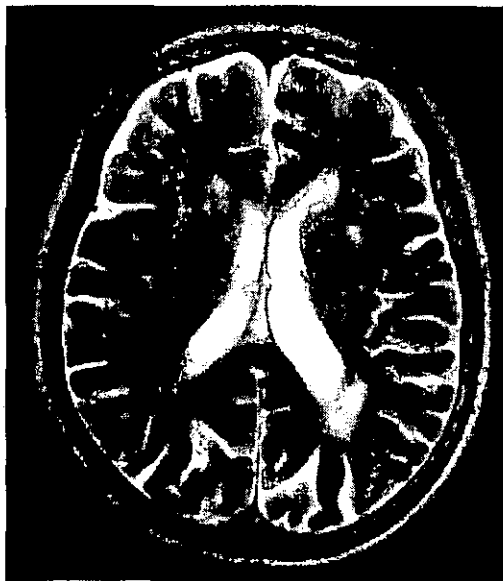
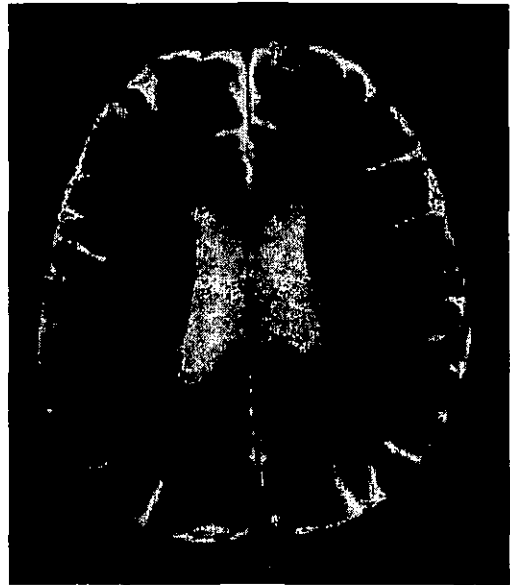
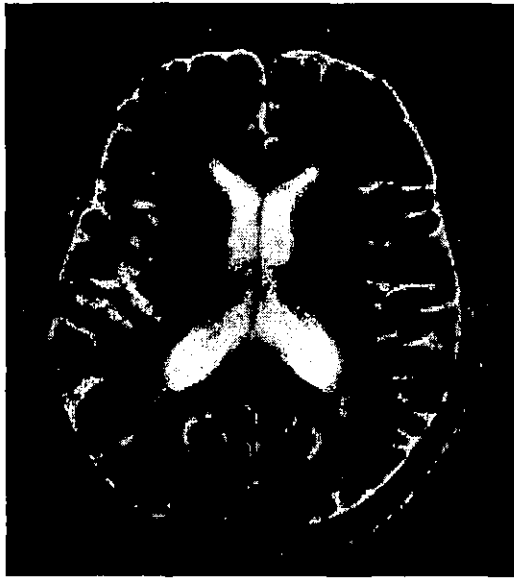
I. None or minimal periventricular signal hyperintensities in the form of caps only in the anterior horn of lateral ventricles.



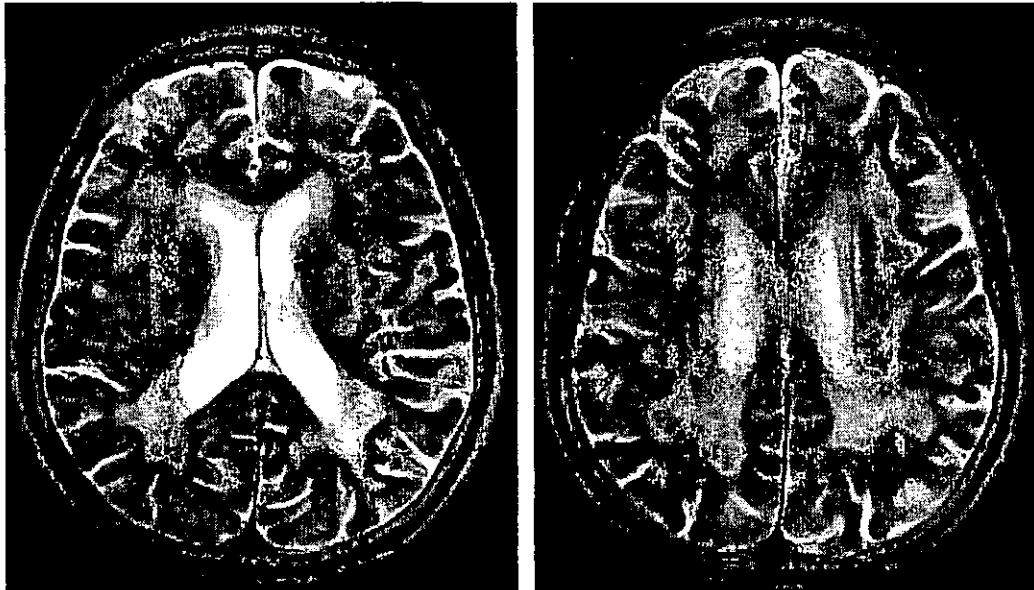
II. Caps in both anterior and posterior horns of lateral ventricles.



III. multifocal periventricular hyperintense punctuate lesions.

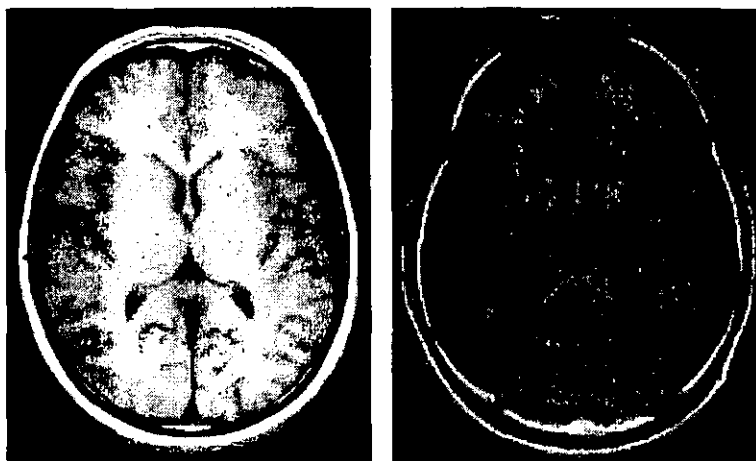


IV. Multiple high signal intensity area that reached confluency in the periventricular region and white matter.

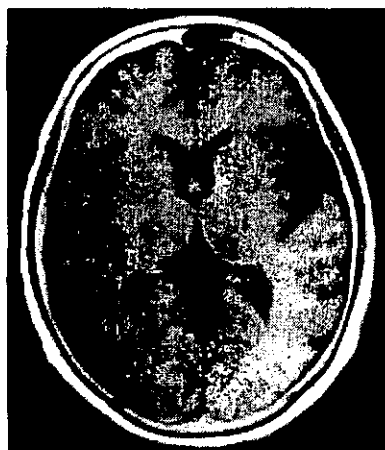


## Ventricular dilatation

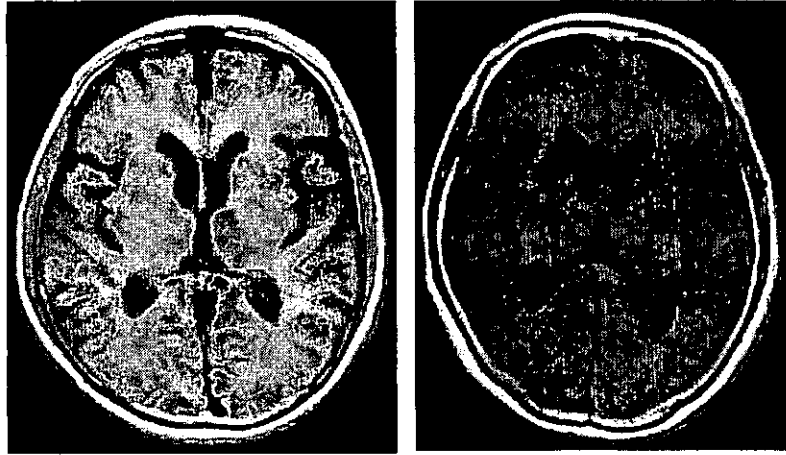
I. none



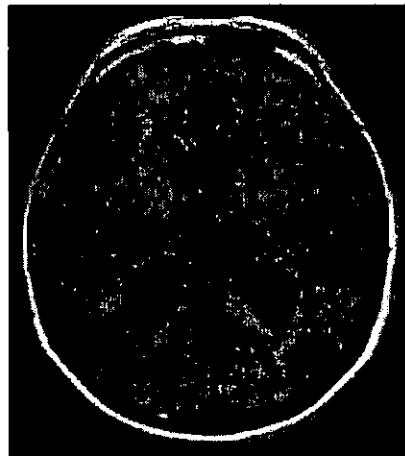
II. mild



III. moderate



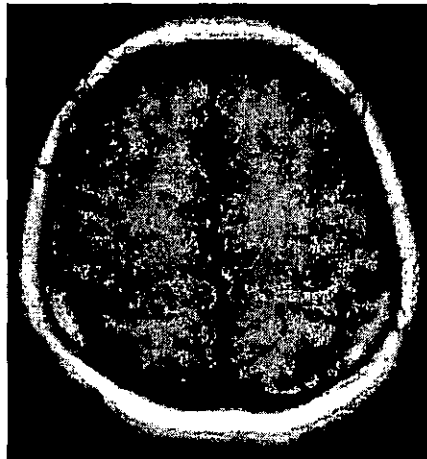
IV. severe





## Brain atrophy

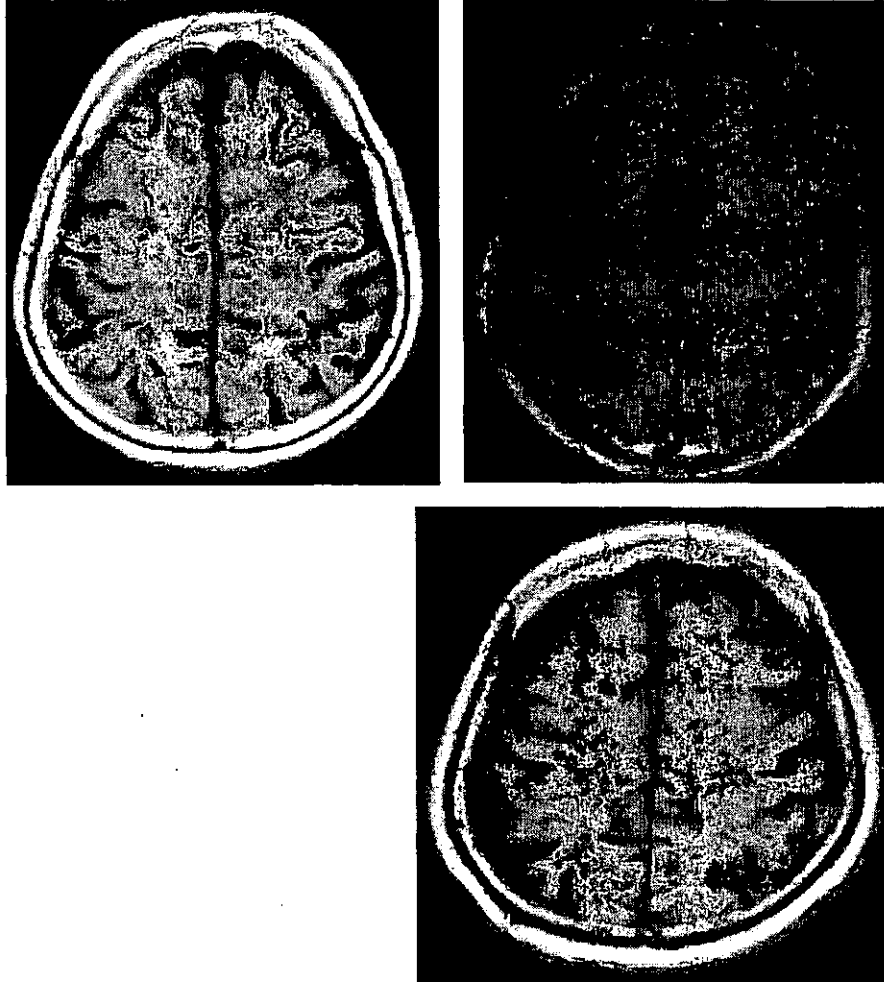
I. none



II. mild



III. Moderate



IV. severe

1) Brain Atrophy

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
normal	Male	150	88.8	176	83.0	143	65.3	55	28.9	7	20.6	531	64.4
	Female	192	99.5	182	97.3	165	85.5	121	62.4	12	50.0	672	85.0
	Total	342	94.5	358	89.7	308	74.8	176	45.8	19	32.8	1203	74.5
mild	Male	19	11.2	35	16.5	71	32.4	108	56.8	19	55.9	252	30.6
	Female	1	0.5	5	2.7	28	14.5	71	36.6	12	50.0	117	14.8
	Total	20	5.5	40	10.0	99	24.0	179	46.6	31	53.4	369	22.8
moderate	Male	0	0.0	1	0.5	5	2.3	26	13.7	7	20.6	39	4.7
	Female	0	0.0	0	0.0	0	0.0	2	1.0	0	0.0	2	0.3
	Total	0	0.0	1	0.3	5	1.2	28	7.3	7	12.1	41	2.5
severe	Male	0	0.0	0	0.0	0	0.0	1	0.5	1	2.9	2	0.2
	Female	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Total	0	0.0	0	0.0	0	0.0	1	0.3	1	1.7	2	0.1
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

2) Ventricular Dilatation

Ventricular Dilatation

		40-49yr		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Normal	Male	135	79.9	129	60.8	82	37.4	19	10.0	2	5.9	367	44.5
	Female	172	89.1	147	78.6	123	63.7	56	28.9	4	16.7	502	63.5
	Total	307	84.8	276	69.2	205	49.8	75	19.5	6	10.3	869	53.8
Mild	Male	34	20.1	78	36.8	127	58.0	99	52.1	20	58.8	358	43.4
	Female	20	10.4	39	20.9	67	34.7	111	57.2	16	66.7	253	32.0
	Total	54	14.9	117	29.3	194	47.1	210	54.7	36	62.1	611	37.8
Moderate	Male	0	0.0	5	2.4	10	4.6	57	30.0	10	29.4	82	10.0
	Female	1	0.5	1	0.5	3	1.6	23	11.9	4	16.7	32	4.0
	Total	1	0.3	6	1.5	13	3.2	80	20.8	14	24.1	114	7.1
Severe	Male	0	0.0	0	0.0	0	0.0	15	7.9	2	5.9	17	2.1
	Female	0	0.0	0	0.0	0	0.0	4	2.1	0	0.0	4	0.5
	Total	0	0.0	0	0.0	0	0.0	19	4.9	2	3.4	21	1.3
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

3) Periventricular hyperintensity (PVH)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
not examined	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	1	0.5	0	0.0	1	0.1
	Total	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0	1	0.1
no PVH	Male	167	98.8	198	93.4	157	71.7	73	38.4	11	32.4	606	73.5
	Female	191	99.0	175	93.6	144	74.6	72	37.1	9	37.5	591	74.7
	Total	358	98.9	373	93.5	301	73.1	145	37.8	20	34.5	1197	74.1
mild PVH	Male	2	1.2	11	5.2	43	19.6	50	26.3	9	26.5	115	14.0
	Female	1	0.5	10	5.3	32	16.6	50	25.8	7	29.2	100	12.6
	Total	3	0.8	21	5.3	75	18.2	100	26.0	16	27.6	215	13.3
moderate PVH	Male	0	0.0	2	0.9	16	7.3	63	33.2	14	41.2	95	11.5
	Female	1	0.5	2	1.1	16	8.3	65	33.5	7	29.2	91	11.5
	Total	1	0.3	4	1.0	32	7.8	128	33.3	21	36.2	186	11.5
severe PVH	Male	0	0.0	1	0.5	3	1.4	4	2.1	0	0.0	8	1.0
	Female	0	0.0	0	0.0	1	0.5	6	3.1	1	4.2	8	1.0
	Total	0	0.0	1	0.3	4	1.0	10	2.6	1	1.7	16	1.0
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

4) Cerebrovascular Disease (CVD)

Cerebrovascular Disease (CVD)

		40 - 49yr		50 - 59yr		60 - 69yr		70 - 79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
not examined	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	2	1.0	0	0.0	2	0.3
	Total	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	2	0.1
no cvd	Male	168	99.4	200	94.3	181	82.6	126	66.3	13	38.2	688	83.5
	Female	191	99.0	179	95.7	177	91.7	147	75.8	16	66.7	710	89.8
	Total	359	99.2	379	95.0	358	86.9	273	71.1	29	50.0	1398	86.6
cvd	Male	1	0.6	12	5.7	38	17.4	64	33.7	21	61.8	136	16.5
	Female	2	1.0	8	4.3	16	8.3	45	23.2	8	33.3	79	10.0
	Total	3	0.8	20	5.0	54	13.1	109	28.4	29	50.0	215	13.3
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

Lacuna

		40 - 49yr		50 - 59yr		60 - 69yr		70 - 79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
not recorded	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	2	1.0	0	0.0	2	0.3
	Total	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	2	0.1
no lacuna	Male	168	99.4	202	95.3	186	84.9	135	71.1	18	52.9	709	86.0
	Female	192	99.5	179	95.7	180	93.3	157	80.9	18	75.0	726	91.8
	Total	360	99.4	381	95.5	366	88.8	292	76.0	36	62.1	1435	88.9
one lacuna	Male	1	0.6	7	3.3	18	8.2	27	14.2	8	23.5	61	7.4
	Female	1	0.5	7	3.7	9	4.7	28	14.4	4	16.7	49	6.2
	Total	2	0.6	14	3.5	27	6.6	55	14.3	12	20.7	110	6.8
multiple lacune	Male	0	0.0	3	1.4	15	6.8	28	14.7	8	23.5	54	6.6
	Female	0	0.0	1	0.5	4	2.1	7	3.6	2	8.3	14	1.8
	Total	0	0.0	4	1.0	19	4.6	35	9.1	10	17.2	68	4.2
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

Thrombosis

		40 - 49yr		50 - 59yr		60 - 69yr		70 - 79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
not recorded	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	2	1.0	0	0.0	2	0.3
	Total	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	2	0.1
no thrombosis	Male	169	100.0	211	99.5	217	99.1	181	95.3	27	79.4	805	97.7
	Female	192	99.5	187	100.0	188	97.4	183	94.3	22	91.7	772	97.6
	Total	361	99.7	398	99.7	405	98.3	364	94.8	49	84.5	1577	97.6
thrombosis	Male	0	0.0	1	0.5	2	0.9	9	4.7	7	20.6	19	2.3
	Female	1	0.5	0	0.0	5	2.6	9	4.6	2	8.3	17	2.1
	Total	1	0.3	1	0.3	7	1.7	18	4.7	9	15.5	36	2.2
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

Cerebral Embolism

		40 - 49yr		50 - 59yr		60 - 69yr		70 - 79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
not recorded	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	2	1.0	0	0.0	2	0.3
	Total	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	2	0.1
no embolism	Male	169	100.0	211	99.5	214	97.7	184	96.8	32	94.1	810	98.3
	Female	193	100.0	187	100.0	193	100.0	189	97.4	24	100.0	786	99.4
	Total	362	100.0	398	99.7	407	98.8	373	97.1	56	96.6	1596	98.8
embolism	Male	0	0.0	1	0.5	5	2.3	6	3.2	2	5.9	14	1.7
	Female	0	0.0	0	0.0	0	0.0	3	1.5	0	0.0	3	0.4
	Total	0	0.0	1	0.3	5	1.2	9	2.3	2	3.4	17	1.1
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

Cerebral Bleeding

		40 - 49yr		50 - 59yr		60 - 69yr		70 - 79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
not recorded	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	2	1.0	0	0.0	2	0.3
	Total	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	2	0.1
no bleeding	Male	168	99.4	211	99.5	218	99.5	188	98.9	34	100.0	819	99.4
	Female	193	100.0	187	100.0	193	100.0	191	98.5	23	95.8	787	99.5
	Total	361	99.7	398	99.7	411	99.8	379	98.7	57	98.3	1606	99.4
cerebral bleeding	Male	1	0.6	1	0.5	1	0.5	2	1.1	0	0.0	5	0.6
	Female	0	0.0	0	0.0	0	0.0	1	0.5	1	4.2	2	0.3
	Total	1	0.3	1	0.3	1	0.2	3	0.8	1	1.7	7	0.4
Total	Male	169	100.0	212	100.0	219	100.0	190	100.0	34	100.0	824	100.0
	Female	193	100.0	187	100.0	193	100.0	194	100.0	24	100.0	791	100.0
	Total	362	100.0	399	100.0	412	100.0	384	100.0	58	100.0	1615	100.0

## **XIII. Oral examinations**



### **XIII. Oral examinations**

- 1) Dental status**
- 2) Periodontal status**
- 3) Denture wearing**
- 4) Tongue coating status**

A calibrated dentist asserted the participator's oral health conditions, including decayed, missing and filled teeth, periodontal status, denture wearing habit, and tongue coating status.

#### **1) Dental status**

The numbers of intact, filled, caries observation, decayed, and missing teeth were counted.

#### **2) Periodontal status**

The periodontal status was evaluated according to the Community Periodontal Index (10 index teeth: 17/16, 11, 26/27, 36/37, 31, 47/46), based on the World Health Organization standard.

code 0 : healthy gingival tissues

code 1 : bleeding after probing

code 2 : calculus detected or defective restoration margins

code 3 : pocket 4mm or more and less than 6 mm

code 4 : pocket 6 mm or more

missing, others

#### **3) Denture wearing habit**

The participator's behaviour of denture wearing was asked.

Wearing : no-use, sometime, always

#### 4) Tongue coating status

The tongue coating status was asserted according to distribution area as follows:

score 0 : none visible

score 1 : less than one-third of tongue dorsum surface covered

score 2 : less than two-thirds of tongue dorsum surface covered

score 3 : two thirds and more of tongue dorsum surface covered

1) Dental status

The numbers of intact, filled, caries observation, decayed, and missing teeth were counted.

Number of intact teeth

	40-49yr			50-59yr			60-69yr			70-79yr			80yr-			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Male	15.3	5.5	164	14.7	6.8	212	12.0	7.6	222	5.9	6.4	199	3.9	4.7	34	11.5	7.7	831
Female	13.7	5.2	190	11.9	6.2	184	9.4	6.7	191	4.8	5.4	197	2.8	5.5	23	9.7	6.9	785
Total	14.5	5.4	354	13.4	6.7	396	10.8	7.3	413	5.3	5.9	396	3.5	5.0	57	10.6	7.4	1616

Number of filled teeth

	40-49yr			50-59yr			60-69yr			70-79yr			80yr-			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Male	11.6	5.1	164	9.9	5.6	212	9.4	5.8	222	8.3	6.6	199	7.8	6.2	34	9.6	6.0	831
Female	13.1	4.5	190	13.1	4.9	184	12.1	5.4	191	10.4	6.7	197	6.0	6.6	23	12.0	5.7	785
Total	12.4	4.8	354	11.4	5.5	396	10.7	5.8	413	9.3	6.7	396	7.1	6.4	57	10.8	5.9	1616

Number of caries observation teeth

	40-49yr			50-59yr			60-69yr			70-79yr			80yr-			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Male	0.3	0.7	164	0.3	0.7	212	0.1	0.5	222	0.0	0.2	199	0.1	0.3	34	0.2	0.6	831
Female	0.2	0.6	190	0.2	0.5	184	0.2	0.5	191	0.0	0.3	197	0.0	0.0	23	0.2	0.5	785
Total	0.3	0.6	354	0.2	0.6	396	0.1	0.5	413	0.0	0.2	396	0.0	0.3	57	0.2	0.5	1616

Number of decayed teeth

	40-49yr			50-59yr			60-69yr			70-79yr			80yr-			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Male	0.5	1.3	164	0.5	1.5	212	0.6	1.6	222	0.5	1.3	199	1.1	2.3	34	0.6	1.5	831
Female	0.3	1.1	190	0.4	1.0	184	0.3	0.7	191	0.5	1.5	197	0.2	0.5	23	0.3	1.1	785
Total	0.4	1.2	354	0.5	1.3	396	0.4	1.3	413	0.5	1.4	396	0.7	1.9	57	0.5	1.3	1616

Number of missing teeth

	40-49yr			50-59yr			60-69yr			70-79yr			80yr-			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Male	4.2	2.0	164	6.5	5.5	212	9.8	8.0	222	17.2	10.0	199	19.0	9.5	34	10.0	8.9	831
Female	4.6	2.2	190	6.3	4.2	184	10.0	7.5	191	16.2	9.2	197	23.0	9.6	23	9.8	8.2	785
Total	4.4	2.1	354	6.4	4.9	396	9.9	7.7	413	16.7	9.7	396	20.6	9.7	57	9.9	8.6	1616

Others

	40-49yr			50-59yr			60-69yr			70-79yr			80yr-			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Male	0.1	0.4	164	0.2	0.5	212	0.1	0.6	222	0.1	0.5	199	0.1	0.5	34	0.1	0.5	831
Female	0.1	0.3	190	0.1	0.3	184	0.1	0.4	191	0.1	0.4	197	0.0	0.0	23	0.1	0.4	785
Total	0.1	0.3	354	0.1	0.4	396	0.1	0.5	413	0.1	0.5	396	0.1	0.4	57	0.1	0.4	1616