

特集：

## 自閉症療育における里山を利用した山林活動の可能性

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### The possibility of forest activities in the autistic disabilities treatment by utilizing the rural forest

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#### 抄録

森林の持つ保健休養機能は、一般の人々の森林レクリエーションのみでなく、知的あるいは身体障害者の療育やリハビリテーション、セラピーなどにとっても重要な意義を持っている。しかしながら、実際にそれらの適切な活動の場を設定することは容易でないことが多い。

自閉症は、脳の機能障害の1つとして知られ、その主な障害は、他者とのコミュニケーション障害や認知機能障害、行動障害などである。自閉症の発症原因や効果的な治療方法はいまだに明らかにされていないが、自閉症のような知的および認知障害の療育やリハビリテーションには身体全体の運動を行うことが基本におかれている。多くの自閉症者は、その障害の持つ異常行動のために、日常面や社会生活、野外体験などにおいて制約を受けることが多いが、野外において心身の機能を刺激し、覚醒することは療育上重要な意義を持っている。

本論では、長野県の自閉症療育施設において森林作業と散策を中心としたレクリエーションから成り立つ山林活動を行った結果、入所者にあらわれた変化を報告するものである。3年間の森林療育活動によって、ほとんどの調査対象者には作業能力の向上や、それに伴ってコミュニケーション能力の向上が認められ、自閉症状や日常生活における異常行動にも緩和が認められた。これらの結果から自閉症の療育活動として、ま

た、里山の有効利用の1つとして、山林活動が有効である可能性が示されたものと考えられる。

#### キーワード

自閉症、療育、山林活動、森林レクリエーション、里山

#### Abstract

Forest amenity is not only important for general forest recreational activities but also treatment, rehabilitation, and therapy for people with mental or physical disabilities. It is not, however, easy to find suitable forest sites for the treatment activities.

Autism is known as one of the disabilities of the brain. The main symptoms are discommunication with others, cognitive impairments, and abnormal behaviors. The reason for its occurrence has not been made clear yet and a radical cure for it has not been discovered, either. First of all, the treatment and rehabilitation of mental and cognitive disability like autism is generally geared towards training the body. However, many autistic persons have often been restricted in their experiences in ordinary life, society, and even in outdoor experiences, because of their abnormal behaviors. Therefore,

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having experiences in outdoors to train and stimulate body functions has an important meaning as one of the treatment ways.

This paper aims to show the changes of clients in a treatment institution through their involvement in forest activities which consisted of work and recreation in the regional forest in Nagano prefecture, Japan. Because of their involvement in forest activities over a three year period, according to the improvement of working abilities, the communication abilities of most of these clients have improved. Autistic conditions have also eased and their general behaviors and basic life abilities have come to be normalized. These empirical results suggest the forest activities have the possibility of effective autism treatment and also present the possibility of the useful utilizing of the rural forest.

### **Key words**

**autism, treatment, forest activity, forest recreation, rural forest**

### **1. Introduction**

The number of people who go to the forest or woods to enjoy nature has increased and forest recreation has been also attracted public attention as one of the healing activities to promote health (Japan Forest Agency, 1994). The civil movement and interest of tending the rural forest by volunteers have been increased, too (JFA, 1994). However, forest recreation and activities are not only useful for the general public but also for persons with mental or physical disabilities, to have outdoor experiences (Sanders 1982), treat their disabilities, and stimulate their body functions (Uehara, 1996, 1997, 1998).

Autism is a disability of the brain and life long impairments (Carter et al, 1995). It is usually apparent before age three and the present rate of occurrence is said to be 1 per 1000 peo-

ple (Japan Autism Association, 1995). The usual symptoms are abnormal patterns of social interaction, communication, cognitive disabilities, and stereotyped patterns of behavior or special interests (American Psychiatric Association, 1994). Also, autistic people sometimes have a "panic reaction" and "self injury" which include accidental crying, tantrums, and extreme distress for no apparent reason (Division TEACCH, Univ. of North Carolina, 1996). To treat and rehabilitate autism, training the sufferers' bodies and letting their consciousness escape to the outside world is the first step (Carter et al, 1995). When their bodies are well trained, they will be hopefully able to move their hands and feet, work with them, and also try to express themselves (Mogi, 1990). Therefore, to treat and rehabilitate autism, certain body training, skill training programs, and the right environment are important elements. However, many mentally disabled and autistic people have often been restricted in their experiences in ordinary life, society, and even in the outdoors, because of their abnormal behaviors (West, 1981). As a consequence, their inner frustration increases and their bodies are often not only weakened but also their communication skills are undeveloped.

Some cases of outdoor activities in the mental disabilities' treatment have been already reported. Outdoor recreation which includes walking and enjoying the natural environment can affect entire body functions (Carter et al, 1995). The Carolina Living Learning Center (CLLC) of the University of North Carolina has reported the effects of outdoor activities like gardening, landscaping, and hiking are useful for the treatment of autism (Van Bourgondien, 1993). CLLC reported that outdoor vocational therapy and recreation can ease autistic conditions by cognitive stimulation and spatial extension, too. The ramifications of working in areas like pruning,

salvage cutting, and weeding in a forest setting have also indicated the importance as a treatment on mental disabilities (Sanders, 1982). The synthetic utilization of a rural forest by a welfare institution for persons with mental disabilities was also reported (Nakagawa, 1996) and a couple of reports have already put forth the hypothesis that forest works would be effective as a form of autism treatment (Uehara, 1996, 1997, 1998, 1999). Forest environment has advantages for recreational settings because of its various functions (Itoh, 1991, Tadaki, 1996). This paper further aims to explore in detail based on the ramifications for treatment and rehabilitation of forest activities which include both work and recreation to consider the possibilities of one of the forest amenity functions and utilizing the rural forest.

## 2. Method

We observed and evaluated the changes of autistic clients participating in forest activities of a treatment institution for persons with autistic disabilities, "Shirakaba no ie" in Nagano prefecture. The observers also participated in the activities as therapeutic instructors during May of 1995 to August of 1997. Evaluative points were given in five categories which were "working ability", "communication ability", "ease of autistic conditions", "changes in behavior", and "basic life ability". "Working ability" was evaluated on working attitude, cognitive abilities at work, working skill, and so forth. In this case, the "working attitude" means positiveness to work and was evaluated on each participant at work. For example, if the participant mostly attended the work independently, the participant was evaluated "active" and if the participant generally needed the calling or helping of instructors to attend the work, the participant was evaluated "passive". The reason for "working attitude"

was included in the "working ability" category was that first of all, positiveness was important to do the work as well as judging the attitude of the participants. "Communication ability" was evaluated by understanding instructions, expressing ability, and self consciousness. "Ease of autistic consciousness" was evaluated by decreasing panic reaction which was one of the typical autistic acting disabilities and mind stability after working. "Changes in behavior" was evaluated by general behaviors in the forest works and "changes in basic life ability" was evaluated by the daily progress of their situation. Each of the five categories were done by using three scales which were "Pass (always fine)", "Even (sometimes fine)", and "Fail (mostly inferior)" by comparing their conditions before and after experiencing the forest activities at the end of each year for three years. The observers were all instructors of the institution and all of the evaluations were done by mutual agreement to keep objectivity.

### 1) Site & contents of activities

The testing took place at an autism treatment institution "Shirakaba no ie" in Ikeda, a town in the Kita-Azumi region of Nagano prefecture. This institution has regarded forest activities as its main treatment since it was established. The reasons for selecting forest activities on treatment was that various forest amenities could be expected to be effective for easing autistic conditions and experiences (Shirakaba no ie, 1994). The forest activities took place in deciduous secondary forests (*Quercus serrata*, *Quercus acutissima*, *Castanea crenata*, *Fagus crenata*, *Acer palmatum*, *Magnolia obovata*, *Prunus jamasakura*, *Betula platyphylla var. japonica*, *Aesculus turbinata* and etc.) around the institution in the Kita-Azumi region. The total forest area for the treatment (work and recreation) was approximately 4 hectares. The regional for-

est union managed the forest area by entrusting of land owners and the union permitted the institution to work, make products, recreation, and maintenance of the land. The forest activities consisted of work and recreation, and their ratio was about 3:2 to 4:1. The forest work consisted of producing inoculated logs of *Shiitake* mushrooms, which involved mainly inserting mushroom fungus spores into bed logs and carrying and piling them up. The work was divided into simple activities to make it easy to participate. Also, participants could attend the activities at their will, not by compulsory orders. Forest recreation mainly consisted of walking,

hiking, and other such recreational activities through out the year. Forest activities were done for four to six hours on weekdays through out the year, despite the weather or season to experience forest amenity.

2) Participants

Table 1 shows a profile of the participants. The group consisted of 22 people (17 males and 5 females. Mean Age = 19.5, Standard Deviation = 3.6 at the beginning) who did not have severe physical disabilities and could attend the forest activities of the institution.

Table 1 Profile of participants at beginning of the treatment.

Person	Age	Sex	Main autistic symptoms	Special features	Conversation Ability (Utterance)
A	14	M	panic, echolalia	obese	a little
B	15	M	echolalia, persistence	being confined to a house, likes simple handicraft	a little
C	15	F	panic, echolalia	dislike outdoor works, getting clothes dirty	a little
D	15	F	persistence	able to do simple works	none
E	15	M	panic	difficult to attend group works	none
F	16	M	panic, overactivity	difficult to attend works, unskillful hands	a little
G	16	M	panic	dislikes outdoor works	a little
H	16	M	panic, persistence	obese	none
I	19	M	persistence	able to do simple works	a little and unclear
J	19	M	persistence	too sensitive to sounds	a little
K	20	M	echolalia, persistence	liked to move and go out (cycling)	a little
* L	20	M	panic	difficult to attend works	none
* M	21	M	echolalia	able to do simple works	a little
* N	21	F	echolalia	able to simple works	a little
* O	22	F	panic	unable to do group acts, sensitive to sounds	babble
* P	22	F	panic, persistence	sensitive to sounds, obese, disliked moving	a little
* Q	22	M	panic, echolalia	able to do simple works	a little
* R	22	M	echolalia	able to do simple works	a little
* S	24	M	persistence	lack of practical experience, epilepsy	none
* T	24	M	persistence	difficult to attend works	a little
* U	24	M	echolalia, persistence	unable to do group acts, able to do farm works	a little
* V	26	M	panic, persistence	unable to do group acts	babble

Note: ①\* marks having experienced treatment at another institution. The others were students of schools for disabled children.

②"echolalia" is to repeat another's words. "Persistence" is stereotyped patterns of behavior or interests.

Table 2 Changes in working ability.

Person	Working attitude		Finding bed logs	Receiving logs	Lifting up logs	Carrying logs	Finishing the job	Piling logs up	Receiving fungus spawn	Finding the insert holes	Inserting spawn	Checking the miss of insert
	Passive	Active										
A	○	○	○	○	○	○	○	○	○	○	○	○
B	○	○	○	○	○	○	○	○	○	○	○	○
C	○	○	○	○	○	○	○	○	○	○	○	○
D	○	○	○	○	○	○	○	○	○	○	○	○
E	○	○	○	○	○	○	○	○	○	○	○	○
F	○	○	○	○	○	○	○	○	○	○	○	○
G	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○
I	○	○	○	○	○	○	○	○	○	○	○	○
J	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○
L	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○
O	○	○	○	○	○	○	○	○	○	○	○	○
P	○	○	○	○	○	○	○	○	○	○	○	○
Q	○	○	○	○	○	○	○	○	○	○	○	○
R	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○
T	○	○	○	○	○	○	○	○	○	○	○	○
U	○	○	○	○	○	○	○	○	○	○	○	○
V	○	○	○	○	○	○	○	○	○	○	○	○
X	△	△	△	△	△	△	△	△	△	△	△	△
X→	○	○	○	○	○	○	○	○	○	○	○	○
△→	○	○	○	○	○	○	○	○	○	○	○	○
(X)	○	○	○	○	○	○	○	○	○	○	○	○
(△)	○	○	○	○	○	○	○	○	○	○	○	○
(○)	1 4	8	1 4	1 6	2 0	1 9	1 7	1 6	1 9	1 9	2 0	1 4

Note:[Evaluation] ① "○" indicates "Pass" "△" indicates "Even" "×" indicates "Fail"

② "→" indicates a change from the beginning until three years later.

"( )" indicates same ability since the beginning of forest activities.

### 3. Results and Discussion

#### 1) Evaluation of working ability:

Table 2 shows the evaluation of working ability. The changes in the working attitude of the participants were observed. In particular, a positive change in the work attitude of 13 people was recognized. The changes were remarkable when compared to previous conditions and the changes in attitude affected their other abilities, as well. Some people were lacking work experience, such as even moving around outdoors and they could not attend activities in the beginning. However, at first, they began to imitate the instructors' actions and react to the instruction. When they completed an activity, even if incorrectly, their efforts were recognized by their instructors. This acceptable attitude of instructors may be one reason for their change in attitude. Their physical functions and strength were also exercised by the activities like walking on the forest slope, and looking around, touching forest vegetation, finding, holding up, carrying, piling logs, and so forth.

#### 2) Evaluation of communication abilities:

Table 3 shows the evaluation of communica-

Table 3 Change in communication ability.

Person	Understanding explain of Works	Express of Inform.	self intention	conscious
A	△→○	○	○	△
B	○	○	○	△
C	○	○	○	△
D	△→○	○	○	△
E	△→○	○	○	△
F	△→○	○	○	△
G	△→○	○	○	△
H	△→○	○	○	△
I	△→○	○	○	△
J	△→○	○	○	△
K	△→○	○	○	△
L	△→○	○	○	△
M	△→○	○	○	△
N	△→○	○	○	△
O	△→○	○	○	△
P	△→○	○	○	△
Q	△→○	○	○	△
R	△→○	○	○	△
S	△→○	○	○	△
T	△→○	○	○	△
U	△→○	○	○	△
V	△→○	○	○	△
X	△→○	○	○	△
△	3	1	1	2
△→○	0	1	1	3
○	3	1	2	3
(△)	1	0	2	1
(△→○)	2	2	7	5
(○)	13	17	9	8

tion abilities. In order to be able to attend activities, although autism is a communication disability, their communication abilities have also had to improve. Some people have come to ask about the work or express their will, and reach for the attention of instructors. The forest work was a common purpose and the forest site was a common cognitive place for both clients and instructors. This natural situation might be also effective to make clients express their emotion and promote improving communication abilities.

#### 3) Evaluation of easing autistic conditions:

Table 4 shows evaluation of easing autistic conditions. A decrease in the occurrence of the panic reaction has been confirmed. Panic reactions had occurred mostly indoors and they seldom occurred in the forest environment. The stability of emotion after the forest work or recreation was also recognized for half of the clients. These results suggest that forest activities could ease autistic conditions, or make them easier to control. Some clients enjoying the natural amenity of cool breezes, sunlight through the trees, playing with fallen leaves

Table 4 Ease of autistic conditions.

Person	Decreasing occurrence while walking	while works in forests	Stability after works
A	○	△	△→○
B	○	△	△→○
C	△→○	△→○	△→○
D	△→○	△→○	△→○
E	△→○	△→○	△→○
F	△→○	△→○	△→○
G	△→○	△→○	△→○
H	△→○	△→○	△→○
I	△→○	△→○	△→○
J	△→○	△→○	△→○
K	△→○	△→○	△→○
L	△→○	△→○	△→○
M	△→○	△→○	△→○
N	△→○	△→○	△→○
O	△→○	△→○	△→○
P	△→○	△→○	△→○
Q	△→○	△→○	△→○
R	△→○	△→○	△→○
S	△→○	△→○	△→○
T	△→○	△→○	△→○
U	△→○	△→○	△→○
V	△→○	△→○	△→○
X	△→○	△→○	△→○
△	1	2	2
△→○	0	0	0
○	3	5	4
(△)	0	5	6
(△→○)	4	5	6
(○)	13	10	10
			7

and forest soil, climbing trunks, and so forth were also observed.

4) Evaluation of changes in behavior:

Table 5 shows the evaluation of changes in behavior. It is generally difficult to attend group activities and recognize other person's need for autistic persons. Although, some participants have been able to function as group members and obey group rules. Group activities in the natural environment over a long period, can make it easier for autistic people to recognize human relationships.

5) Evaluation of basic life abilities:

Table 6 shows the evaluation of basic life abilities. By increasing forest experiences, some clients' basic life ability also changed. Especially, some participants used to be unable to fall sleep before attending treatment activities, however, forest work or forest recreation has helped them to sleep. Also, some participants have come to pay attention to the environment around them like outside of their own room, building, and also the weather conditions.

6) Authorizing of five categories' changes and correlation between working abilities and other categories:

Table 5 Changes in behavior.

Person	Being punctual	Staying at working field	Keeping rules of eat and drink order	Keeping rules of order of get	Attending the excretion group activity	Getting on,off and safe posture in a car
A	(△)	(△)	(△)	(△)	(△)	(△)
B	(△)	(△)	(△)	(△)	(△)	(△)
C	(△)	(△)	(△)	(△)	(△)	(△)
D	(△)	(△)	(△)	(△)	(△)	(△)
E	(△)	(△)	(△)	(△)	(△)	(△)
F	(△)	(△)	(△)	(△)	(△)	(△)
G	(△)	(△)	(△)	(△)	(△)	(△)
H	(△)	(△)	(△)	(△)	(△)	(△)
I	(△)	(△)	(△)	(△)	(△)	(△)
J	(△)	(△)	(△)	(△)	(△)	(△)
K	(△)	(△)	(△)	(△)	(△)	(△)
L	(△)	(△)	(△)	(△)	(△)	(△)
M	(△)	(△)	(△)	(△)	(△)	(△)
N	(△)	(△)	(△)	(△)	(△)	(△)
O	(△)	(△)	(△)	(△)	(△)	(△)
P	(△)	(△)	(△)	(△)	(△)	(△)
Q	(△)	(△)	(△)	(△)	(△)	(△)
R	(△)	(△)	(△)	(△)	(△)	(△)
S	(△)	(△)	(△)	(△)	(△)	(△)
T	(△)	(△)	(△)	(△)	(△)	(△)
U	(△)	(△)	(△)	(△)	(△)	(△)
V	(△)	(△)	(△)	(△)	(△)	(△)
X→△	3	2	1	1	2	2
X→○	1	0	1	0	0	0
△→○	3	1	0	2	2	3
(X)	0	0	3	1	0	0
(△)	5	4	6	3	7	4
(○)	10	15	11	15	11	13
○→△	0	0	0	0	0	0

Table 6 Changes in basic life ability.

Person	Getting dresses for the weather out	Going Walking	Eating by oneself	Excreting by oneself	Taking out & shoes from a cupboard	Changing clothes	Able to sleep
A	(△)	(○)	(○)	(○)	(○)	(○)	(○)
B	(△)	(△)	(○)	(○)	(○)	(○)	(○)
C	(△)	(△)	(○)	(○)	(○)	(○)	(○)
D	(△)	(△)	(○)	(○)	(○)	(○)	(○)
E	(△)	(△)	(○)	(○)	(○)	(○)	(○)
F	(△)	(△)	(○)	(○)	(○)	(○)	(○)
G	(△)	(△)	(○)	(○)	(○)	(○)	(○)
H	(△)	(△)	(○)	(○)	(○)	(○)	(○)
I	(△)	(△)	(○)	(○)	(○)	(○)	(○)
J	(△)	(△)	(○)	(○)	(○)	(○)	(○)
K	(△)	(△)	(○)	(○)	(○)	(○)	(○)
L	(△)	(△)	(○)	(○)	(○)	(○)	(○)
M	(△)	(△)	(○)	(○)	(○)	(○)	(○)
N	(△)	(△)	(○)	(○)	(○)	(○)	(○)
O	(△)	(△)	(○)	(○)	(○)	(○)	(○)
P	(△)	(△)	(○)	(○)	(○)	(○)	(○)
Q	(△)	(△)	(○)	(○)	(○)	(○)	(○)
R	(△)	(△)	(○)	(○)	(○)	(○)	(○)
S	(△)	(△)	(○)	(○)	(○)	(○)	(○)
T	(△)	(△)	(○)	(○)	(○)	(○)	(○)
U	(△)	(△)	(○)	(○)	(○)	(○)	(○)
V	(△)	(△)	(○)	(○)	(○)	(○)	(○)
X→△	1	1	0	0	1	1	0
X→○	0	0	0	0	0	0	0
△→○	3	2	0	0	1	0	5
(X)	1	0	0	0	0	0	0
(△)	11	9	1	0	2	1	2
(○)	6	19	21	22	20	20	15

Table 7 shows that the difference of the total points in each category after three years experience of forest activities were significant by rejection tests ( $t(22)=3.1188, p<0.005$ ). Changes were evaluated so that "Pass (○)" was two points, "Even (△)" was one point, and "Fail (×)" was zero points. The correlation between working abilities and other observed matters are shown on Table 8. Communication ability was regarded as a high correlation rate with working abilities.

Table 7 Authorizing of 5 categories changing.  
( $t(22)=3.1188, P<0.005$ )

Observed matters	t
Working ability	3.7466
Communication ability	3.3574
Ease of autistic	3.9184
Changes of behavior	3.4700
Basic life ability	4.1588

Table 8 Relationship between forest working ability and other categories.

Categories	r
Communication ability	0.7838
Ease of autistic	0.4846
Changes of behavior	0.4478
Basic life ability	0.6678

7) Case studies of severe autistic clients:

Two cases of very severe autistic clients are shown in Figure 1 and Figure 2 which indicate the relationship of changes. In spite of severe

autistic disabilities of the above two clients, some changes could be recognized.

Figure 1 indicates the changes in participant O. She was sensitive to sounds and always covered her ears with her hands. She was unable to attend group activities, also. However, after three years of forest experiences, her persistence of rejecting outside sounds has decreased and her communication ability has improved, too. Also, she has come to attend the forest work, forest recreation, and group activities. She has sometimes danced by herself to express her glad emotion in the forest which could be seldom seen in the institution building.

Figure 2 indicates the changes in participant S. He had been treated at another institution for a couple of years, but he had not been completely able to work and do practical experiences in ordinary life. As a consequence, he could not attend the forest work. But over a three year term of treatment in the mostly forest environment, he has come to attend the work and enjoy recreational activities. Especially, he has enjoyed playing and running by himself in the forest. His autistic conditions and basic abilities have simultaneously improved, as well.

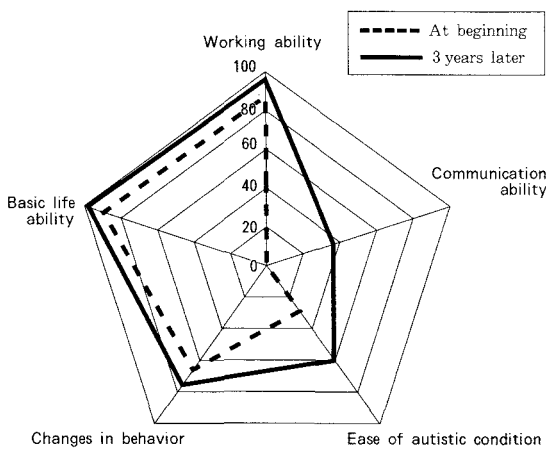


Figure 1 Changes of participant O

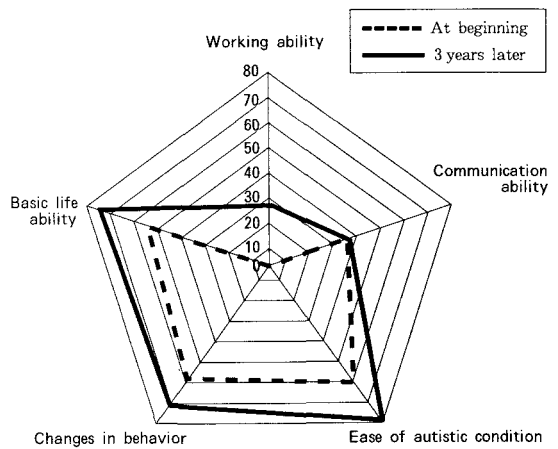


Figure 2 Changes of participant S

**8) The value of a rural forest as a therapeutic place:**

There are a lot of rural forests which are not properly tended or maintained in Japan. However, these forests have the potential to contribute as a recreational and treatment place, too. In this meaning, the rural forest sites can have a value of combining region and social welfare's needs.

**4. Total discussion and conclusion**

Certain ramifications for autistic treatment and rehabilitation by forest activities are shown on Figure 3 and suggested below.

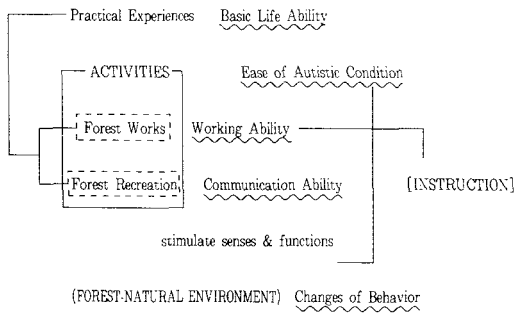


Figure 3 The ramifications of forest activities.

**1) Attending forest activities can make autistic persistence easier:**

At the beginning, most of the participants have a strong persistence which is one of the typical autistic conditions. "Persistence" is stereotyped patterns of behavior or interests. But, as a result of forest activities, they have come to pay attention to various matters, concentrate better on activities, and so, their persistence has decreased. Some clients could not attend vocational activities before, but they could attend the forest activities. This result also suggests forest activities can have possibilities as one of the mental disability treatments.

**2) Amenity of the forest as an important role for treatment:**

The difference from other treatments and the advantage of forest activities is that persons are able to directly experience various natural amenities which have multiple functions to stimulate autistic conditions. For instance, geographic changes, tree shades, sunlight and wind through the trees, birds' sounds, temperature changes, seasonal leaves changing colors, are some of the forest's special amenities.

Forest activities and recreation have the potential to become a major form of treatment for autistic people. In this meaning, we can advocate these forest treatment functions "foster forest" which means treat and care for persons with disabilities.

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