

Critical Analysis of Gati (Gait) in Ayurvedic and Jyotish Science in Modern Perspective and its Impact on Socio Economic Status and Health

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Abstract

Gati' refers to the distinct pattern of walking of an individual [lq[k lapfjr iknk L;kr~ xfr% A u`-lk-"kk- 3@14]. It is one of the body parameter which needs to be examined under 'Ayu laxanas' (body characteristics) for the assessment of strength of the body as well as for futuristic outcome of health and wellbeing. In modern medical science, Gati is referred as the 'Gait' of the patient. There are many such Gaits (distinct walking patterns) are described in ancient Jyotish and Ayurvedic sciences and in modern medical science also. But Ayurvedic and Jyotish science take into consideration the general well being, socio economic status from Gait observation whereas modern medical science thinks of only disease patterns from it. The Ayurvedokta and Jyotish shastrokta Gati (Gait) characteristics could also be studied in modern perspective and their role in disease identification needs to be explored on broader scale with the help of modern science. The Jyotish science is complimentary and contemporary to the Ayurvedic medical science. The principles of Jyotish science have been applied in Ayurvedic science at various places. The various body characteristics and Gati (Gait) are described in 'Sharir Laxan Adhyay' and 'Ayurday Adhyay' of Ayurvedic and Jyotish science respectively. Acharya Charaka had described the 'Gati' in the Vimansthana chapter eight of his treatise 'Charak Samhita' under 'Dashvidha Pariksha' whereas acharya Kashyapa had described it in Laxnadhya of sutrasthana of his treatise 'Kashyapa Samhita'. These Gati characteristics are used to predict the future outcome of health, education, and career and socio economic status. Literary review of literature related to Gati is done to study it critically and comparatively from Ayurvedic and Jyotish science. It is concluded that the Gati characteristics can be used as a parameter for predicting health and socio economic status. The persons having normal well organized walking pattern are immune to the diseases and have good health and fortune.

Keywords: Pramana; Aayam; Vistar; Deergha; Parinah; Angul; Measurement

Abbreviations: CVi: Charak Vimansthana; SSu: Sushrut Sutrasthana; BS: Brihat Samhita; NSSha: Nrusti Samudrik Shastra

Introduction

'Gati' refers to the distinct pattern of walking of an individual [lq[k lapfjr iknk L;kr~ xfr% A u`-lk-"kk- 3@14]. It is one of the body parameter which needs to be examined under 'Ayu laxanas' (body characteristics) for the assessment of strength of the body as well as for futuristic outcome of health and wellbeing. In modern medical science, Gati is referred as the 'Gait' of the patient. There are many such Gaits (distinct walking patterns) are described in ancient Jyotish and Ayurvedic sciences and in modern medical science also. But Ayurvedic and Jyotish science take into consideration the general well being, socio economic status from Gait observation whereas modern medical science thinks of only disease patterns from it [1]. The Ayurvedokta and Jyotish shastrokta Gati (Gait) characteristics could also be studied in modern perspective and their role in disease identification needs to be explored on broader scale with the help of modern science. The Jyotish science is complimentary and contemporary to the Ayurvedic medical science. The principles of Jyotish science have been applied in Ayurvedic science at various places. The various body characteristics and Gati (Gait) are described in 'Sharir Laxan Adhyay' and 'Ayurday Adhyay' of Ayurvedic and Jyotish science respectively. Acharya Charaka had described the 'Gati' in the Vimansthana chapter eight of his treatise 'Charak Samhita' under 'Dashvidha Pariksha' whereas acharya Kashyapa had described it in Laxnadhya of sutrasthana of his treatise 'Kashyapa Samhita'. These Gati characteristics are used to predict the future outcome of health, education, and career and socio economic status. Literary review of literature related to Gati is done to study it critically and comparatively from Ayurvedic and Jyotish science. The Gati characteristics can be used as a parameter for predicting health and socio economic status. The persons having normal well organized walking pattern are immune to the diseases and have good health and fortune.

Material & Method

Literary method of research was adopted in the present study. Critical and comparative study of Ayurvedic literature and Jyotish science literature was done to come to logical conclusion.

Review of Ayurvedic & Jyotish Literature

Gati' Inspection as Parameter under Ayu Laxanas: Acharya Varahamihir had also suggested to examine 'Gati' (Gait) under Ayu laxanas

As per jyotish acharya Varahamihir, under Ayu laxanas, the parameters like height (*Unman*), weight (*Man*), gait (*Gati*), body built (*sanhati*), essence (*Sara*), complexion (*varna*), voice (*swara*), constitution (*Prakriti*) etc should be studied. [B.S. 67/1] (vk;q% mUeku eku xfr lagfr lkj o.kZ Lusg Loj izd'fr lRoa vuvda vknkS {ks= e'tka p dq"kyks voyksD; lkeqznfon~ onfr AA c`-la- 67@1.).

Definition of Gati

- As per jyotish science, Gati is the distinct pattern of walking of an individual. [N.S.S. 3/14] (lq[k lapfjr iknk L;kr~ xfr% A u`-lk-"kk- 3@14).

Some Walking Patterns as per Ayurveda

- The persons having walking pattern like excited elephant, ox, lion, panther, swan are happy like king. [K.S.Su. 28] (eRrxto`kHkflag`kknZwygalxr; ks vf/kir; %A dk-lw- y{k.kk/; k; 28).
- The persons having slow and stable walking pattern are rich. [K.S.Su. 28] (fLrfrxr; ks% /kU; k% A dk-lw- y{k.kk/; k; 28).
- The persons having fast walking are alternately happy and unhappy. [K.S.Su. 28] (piyxr; % piylq[knq[kykfHku% A dk-lw- y{k.kk/;k; 28).
- The persons having crisscross/zigzag pattern of walking are poor. [K.S.Su. 28] (fr; Zdxr; % rq v/kU; k%A dk-lw- y{k.kk/;k; 28).
- The Kapha prakrti individual have well organized pattern of walking. They walk slowly but steadily. [C.Vi. 8/96] ("ys"eyk% vofLFkrxr; %] foTtyRokr~ lqfÜy"VlkjlfU/kcU/kuk%) rFkk·PNRokr~ çléfLÉX/ko.kZLojkÜp HkofUrA r ,oaxq.k;ksr~ "ys"eyk cyoUrks olqeUrks fo|koUr vkstfLou% 'kkUrk vk; q"eUrÜp HkofUrAA¼p-fo- 8@96½).
- The Vata prakrti individual have unstable pattern of walking. They walk fast but unsteadily and their joints make sound while walking. [C.Vi. 8/98] (okryk lrrlfU/k'kCnxkfeu% p HkofUr(r ,oa xq.k; ksxkr~ okryk% çk; s.k vYicyk% p vYik; q"kk%p vkYi viR; k% p vYilk/kuk% p vYi/kuk% p HkofUrAA ¼p-fo- 8@98&100½).
- The person having all the essences have balanced body with balanced movements (r= loSZ% lkjS#isrk%----- fLFkjlekgfr'kjhjk lqlekgfr xr; % A ¼p-fo- 8@111½).

- The walking of Satwasara persons is well organized. [C.Vi. 8/110](Le`freUrks-----lqO; ofLFkrxfr-----p lUolkjk%A ¼p-fo- 8@110½).

Some Male Walking Patterns as per Jyotisha

- The walking in long steps is also good. [N.S.S. 3/14](nh?kZdzek lqyhyk L; kr~ xfr% lqHkxkA u`-lk-“kk- 3@14).
- The males having walking pattern like mongoose, swan and ox are dutiful. [N.S.S. 3/15] (xfr% HkofUr rqY; k; s p ujk f]jn udqy galkuke~A o`kHkL; vfi leklks lrra /keZ vFkZ rRij%AA u`-lk-“kk- 3@15).
- The males having walking pattern like fox, camel, donkey, rabbit, frog or deer are devoid of happiness and government service. [N.S.S. 3/16](xkse; q djHk vlHk d`dy “k”kd Hksd e`xS%A; s`kka xfr lekuk rs xrlq[kjktlUeku%AA u`-lk-“kk- 3@16).
- The males having irregular, unpleasant, slow, short unstable steps with pauses walking pattern is inauspicious and abnormal. Also, males having fast walking with their feets and knees rubbing with each other, pattern is inauspicious and abnormal. [N.S.S. 3/17] (fo`kek fodVk eUnk y?kqdzek papyk nzqrk LrC/kkAvkH; kUrjk vFk ckg; k yXuink ok xfr% u “kqHkkAu`-lk-“kk- 3@17).
- The males having continuous, regular, soundless walking pattern are rich whereas males walking in short steps with pauses are poor economically. [N.S.S. 3/19]. (/kfuuka xeua fLrfera lekfga “kCnfgua LrC/kaA âLo Iyqrk vuqfo/na foyfEcra L; kr~ nfjnz.kke~ AA u`-lk-“kk- 3@19).
- This is because rich peoples are confident and free of economic stress and walks with confidence and zeal. Whereas poor peoples are less confident and worried. Hence walks with confused state of mind in short steps with pauses.

Some Female Walking Patterns as per Jyotisha

- The woman walking like excited elephant, swan with well organized pattern is lucky and enjoy life like queen and highly placed socially. [N.S.S. 5/135]. This is like cool walking. (eRrsu lfUuHkink eneRr erax galxfrqY;

kA lqHkxk xfr% lqyfyrk foylfr olq/ks”kiRuhuke~A u`-lk-“kk- 5@135).

- The woman who walks like cow, ox, mongoose, lion, peacock, cat is bestowed with luck and luxury. [N.S.S. 5/136]. These entire animal walk represents a ‘cat walk’ style of walking. (xks o`kHk udqy e`xifr e;wj ektkZj xkfefu fu; raA lkSHkkX; ;”o; Z; qrk HkkX; orh Hkkxfuh HkofrA u`-lk-“kk- 5@136).
- The woman who walks like frog, owl, wolf, fox, lizard, monkey are unlucky and has to suffer a lot. [N.S.S. 5/137]. (e.Mwd ?kwd o`d cd tEcdw dzks`Vq ljV dfi xr; %A nkSxZR; nq[klfrk tk; Urs ; qor; % izk; %AA u`-lk-“kk- 5@137).
- The fox walk is little faster than normal walk generally involves the border of the sole hitting the ground first.
- The woman who walks in short steps initially and then in long steps with pauses with rubbing of legs internally or bends externally has a abnormal gait. Also who walks slowly with pauses, irregularly in short steps has inauspicious and abnormal gait. [N.S.S. 5/138](âLo Iyqrk vuqfo/nk yLRinkH; kUrjcyk ckg;kA LrC/kk eUnk fo`kek y?kqdzek v”kksHkuk u xfr%A u`-lk-“kk- 5@138).
- The woman who walks slowly is poor. The woman who walks unevenly have unstable mind. The woman who wals like deer is slave or has to do labour work and woman who walks very fast is characterless. [N.S.S. 5/139](fu%Lok foyfEcrxfr% fo`kexfr% fo`kekulk; ks`kr~A nklh dqjaxeuk dqyVk nzqrxkfeuh HkofrAA u`-lk-“kk- 5@139).

Walking Patterns as per Modern Medical Science

Following abnormal patterns of walking are noticed in diseased conditions:

- **Circumducted Gait** - Hemiplegia
- **Shuffling Gait** - Parkinsonism
- **Limping Gait** - Sciatica
- **Duck Gait** - Pseudo muscular hypertrophy
- **Frog Gait** - Pseudo muscular hypertrophy
- **Camel Gait** - Neuro scapulohumoral atrophy
- **Stamping Gait** - Foot drop

Observations

Sr	Walking Pattern	Socio Economic Status	Health Impact
1	Slow and stable walking pattern [Stimit Gati]	Rich	Healthy
2	fast walking [Chapal Gati]	Alternately happy and unhappy	Alternately Healthy
3	Crisscross/zigzag pattern of walking [Tiryak Gati]	Poor	Unhealthy

4	Like elephant, ox, lion, panther, swan	Happy like king.	Healthy
5	Unstable pattern of walking with audible sound of walking [Satat evam Shabdagamina]	Poor	Vataj Prakriti individuals
6	Stable pattern of walking which is barely audible [Vyavasthit Gati evam Shlishta Sandhi]	Rich	Kaphaj Prakriti individuals
7	Well organized pattern [Susamhit and Suvyavasthit]	Rich	Sarvasara & Satvasara Individuals
8	Like fox, camel, donkey, rabbit, frog or deer	Devoid of happiness and government service	Unhealthy
9	Like cow, ox, mongoose, lion, peacock, cat	Bestowed with luck	Healthy
10	Walking with knees rubbing each other	Poor	Unhealthy
11	Circumducted gait [Pakshaghataj Ardchhap Chankraman]	Poor to medium	Hemiplegia
12	Shuffling gait (Laghu Krama Manda Vishama)	Poor to medium	Parkinsonism
13	Limping gait [Grudhrwat]	Poor to medium	Sciatica
14	Duck gait [Batakh Gati]	Poor	Pseudomuscular atrophy
15	Frog gait [Bheka Gati]	Poor	Pseudomuscular atrophy
16	Camel gait [Karabha Gati]	Poor	Neuro scapulohumoral atrophy
17	Reeling Gait [Bhramanwat]	Poor	Alcoholic intoxication
18	Spastic Springing Gait [Khanjaj Chankraman]	Poor	Lathyrism

Table 1: Observation of Walking Pattern.

Discussion

To describe various distinct walking patterns, the ancient acharyas as well as modern scholars have compared these patterns with the walking style of various animals [2]. The modern scholars have restricted these change in walking style up to disease condition only whereas ancient acharyas have broadened the area of research and they have implicated the role of the walking patterns not only in assessment of health and disease but also in the assessment of socio economic status. Persons who walk like cow, ox, mongoose, lion, peacock, and cat are considered to be lucky. These entire animal walk represents a 'cat walk' style of walking. A person who walks like camel, donkey, rabbit, deer frog, owl, wolf, fox, lizard, and monkey are considered to be unlucky and has to suffer a lot. The fox walk is little faster than normal walk and generally involves the border of the sole hitting the ground first. The poor and rich criteria and similarly healthy and unhealthy criteria is decided on the fact that persons with abnormal walking will not perform better in life as compared to persons having normal walk [3]. Abnormal walking has restriction of work and many actions. Also it has the attached social stigma. They are considered inferior. Their mental framework also gets altered and they face depression and fail on many fronts of life.

The ancient and modern abnormal walking pattern can be correlated as follows:

- Hemiplegic / Spastic / Circumducting Gait (i{kk?kkrt padze.k):** Because of paralysis of one half of the body active forward projection of paralysed limb is difficult and patient tends to fall on the ground (*Sharir Ardham Akarmanyam Patati Asun* [S.Ni. 1/62]). The ball of great toe rubs against the ground. Paralysed arm is adducted flexed at elbow. Fingers, wrist and the forearm is pronated. Foot often inverted and planter flexed.
- Limping Gait (x`?kzor padze.k):** Walks like vulture (Grudhra vat). i.e. patient limps with short steps keeping the painful limb semifused and dropping the pelvis towards painful side it occurs in disease Grudhrasi (Sciatica).[C.Chi.28/56]. It is also noticed in the disease *Khanja* (monoplegia of leg).
- Reeling Gait (Hkze.kor padze.k):** In severe vertigo, diplopia and alcoholic intoxication there is marked unsteadiness. Particularly on turning. [M.N.17/19-1]
- Senile Gait (tjk "kks'kh padze.k):** Short, shuffling steps with tremors. [M.N. 10/16-17]
- Spastic Springing Gait (dyk;[katt padze.k):** dEirs xeu vkjEHks [katu bo p ;kfrAadyk;[kat rke~ fo|kr~ eqDr lfU/k izca/kue~Aa ¼v-la-fu- 15@46½. In lathyrism, patient limps and springs while walking (*Prakraman Vepate Khanj Eva Gachhati* [S.Ni.1/78]). At first the patient walks on tip toe. The body is raised high before

- toes leave the ground giving rise to up and down movements of the shoulder. Tilting of pelvis and circumduction of legs occurs. The legs are crossed scissorwise. Later patient uses one or two sticks to walk.
6. **Shuffling / Festinant Gait (y?kqdz eUnk fo'kek xfr%)**
 7. The woman who walks in short steps initially and then in long steps with pauses with rubbing of legs internally or bends externally has a abnormal gait. Also who walks slowly with pauses, irregularly in short steps has abnormal gait. [N.S.S. 5/138] (âLo Iyqrk vuqfo/nk ylrInkH;kUrjcyk ckg;kA LrC/kk eUnk fo'kek y?kqdz v"kkshkuk u xfr%A u`-lk-"kk- 5@138).
 8. The males having irregular, unpleasant, slow, short unstable steps with pauses walking pattern is inauspicious and abnormal. [N.S.S. 3/17] (fo'kek fodVk eUnk y?kqdzek papyk nzqrk LrC/kk xfr% u "kqHkkAA u`-lk-"kk- 3@17).
 - **As per modern science:** the patient bent forwards (flexion dystonia) and advances with rapid short shuffling steps due to rigidity. Turning occurs without lifting the leg. No arm swinging while walking. It is commonly seen in Parkinsonism.
 9. **Waddling / Duck Gait:** Walking like duck. The pelvis is rotated through an abnormally large arc with compensatory lardosis. The heels and toe tend to be brought down simultaneously. It is seen in pseudomuscular hypertrophic dystrophies.
 10. **Frog Gait (Hksdxfr):** The males having walking pattern like frog are devoid of happiness. [N.S.S. 3/16](Hksd ;s'kka xfr lekuk rs xrlq[kjktlUeku%AA u`-lk-"kk- 3@16).
 - **As per modern science,** In later stages of muscular dystrophy when the power to stand erect is lost, patient crawls on hands and toes.
 11. **Camel Gait (djHkxfr):** The males having walking pattern like camel are devoid of happiness. [N.S.S. 3/16](djHk ;s'kka xfr lekuk rs xrlq[kjktlUeku%AA u`-lk-"kk- 3@16).
 - **As per modern science,** In fascio-scapulo-humeral dystrophy, protrusion of buttocks appears like back of camel.
 12. **Unilateral High Stepping Gait:** Hip and knee lifted too high to clear the drop foot from the ground and brought loosely down. It occurs in flaccid paralysis of external popliteal nerve. Bilateral High Stepping Gait can occur in polyneuritis, muscular dystrophies.
 13. **Stamping Gait (Sensory ataxia):** Patient walks on a broad base. Lifts the leg high violently and then brings it down forcibly stamping the heels on the ground. It is seen in tabes dorsalis, carcinomatous neuromyopathy.
 14. **Hysterical Gait:** A bizarre gait not resembling any known pattern of organic disease. Absence of neurological signs.
 15. **Frontal lobe Gait:** Wide base gait. Initiation of walking is difficult. Feet seem to stick to the floor. Tendency to fall backward. It is due to disturbance of connection between frontal cortex, basal ganglia and cerebellum.
 16. **Ataxic gait/ Reeling Gait:**
 17. The ataxia refers to unsteadiness. The gait of cerebellar ataxia appears like reeling or drunken. Patient walks on broad base irregularly. It is of following types:
 - a) Cerebellar ataxia – Encephalitis, Tumour, degeneration, parietal lesion, vascular, alcohol.
 - b) Sensory ataxia – Peripheral neuritis, parietal lesion, spinal cord lesion, tabes dorsalis.
 - c) Central ataxia – Vascular lesion in medulla affecting vestibular nucleus.
 - d) Labyrinthine –Labyrinthitis, Menier's disease, streptomycin induced.
 18. **Scissor Gait (vkH;kUrj layXuIn @ fr;Zdxr;%)**
 - a) vkH;kUrj vFk ckg;k layXuIn ok xfr% u "kqHkkAA u`-lk-"kk- 3@17
 - b) fr;Zdxr;% rq v/kU;k%A dk-lw- y{k.kk/;k; 28
 - c) A person who walks in crisscross fashion or with his knees rubbing each other internally is unhealthy and poor.

It is a form of gait abnormality primarily associated with spastic cerebral palsy in which there is hypertonia in the legs, hips and pelvis as a result these areas become flexed to various degrees, giving the appearance of crouching, while tight adductors produce extreme adduction, presented by knees and thighs hitting, or sometimes even crossing, in a scissors-like movement while the opposing muscles, the abductors, become comparatively weak from lack of use [4-6].

Results

1. Persons with slow and stable walking pattern [*Stimit Gati*] are rich and healthy
2. Persons with fast walking [*Chapal Gati*] are alternately happy and unhappy.
3. Persons with Crisscross pattern of walking [*Tiryak Gati*] are poor and unhealthy.
4. Persons who walk like elephant, ox, lion, and panther are happy like king and Healthy.
5. Persons with unstable pattern of walking and with audible sound of walking [*Sat evam Shabdagamina*] are poor and generally are Vataj Prakriti individuals.

6. Persons with stable pattern of walking which is barely audible [Vyawasthit Gati evam Shlishta Sandhi] are rich and generally are Kaphaj Prakriti individuals.
7. Persons with well-organized pattern [Susamhit and Suvyavasthit] are rich generally are Sarvasara & Satvasara individuals.
8. Persons who Walk Like fox, camel, donkey, rabbit, frog or deer are devoid of happiness and government service and unhealthy.
9. Persons walking like cow, ox, mongoose, lion, peacock, cat are Bestowed with luck and Healthy.
10. Persons walking with knees rubbing each other are poor and unhealthy.
11. Persons with Circumducted gait [Pakshaghataj Ardachap Chankraman] is found in hemiplegia .
12. Persons with Shuffling gait [Laghu Krama Manda Vishama] is found in Parkinsonism
13. Persons with Limping gait [Grudhrwat] are found in Sciatica.
14. Persons with Duck gait [Batakh Gati] is found in Pseudomuscular atrophy
15. Persons with Frog gait [Bheka Gati] is found in Pseudomuscular atrophy
16. Persons with Camel gait [Karabha Gati] is found in Neuro scapulohumoral atrophy
17. Persons with Reeling Gait [Bhramanwat] is observed in Alcoholic intoxication
18. Persons with Spastic Springing Gait [Khanjaj Chankraman] is found in Lathirysm
19. Persons with Scissor Gait [Tiryak Gati] are found in spastic cerebral palsy.

Conclusion

1. The critical comparison of Ayurvedic and Jyotish shastrokta, Gati characteristics, shows marked similarities between them.

2. The Gati characteristics can be used as a parameter for predicting health and socio economic status.
3. Some of the Gati characteristics are exclusively mentioned in Jyotish science only. Hence, those should be incorporated in Ayurveda to enrich the science.
4. The Ayurvedokta and Jyotish shastrokta Gati (Gait) characteristics could also be studied in modern perspective and their role in disease identification needs to be explored on broader scale with the help of modern science.
5. The persons having normal well organized walking pattern are immune to the diseases and have good health and fortune.

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