Clinical Research

Clinical efficacy of Shilajatu (Asphaltum) processed with Agnimantha (Clerodendrum phlomidis Linn.) in Sthaulya (obesity)

Ranjan K. Pattonder¹, H. M. Chandola², S. N. Vyas³

¹Medical Officer (Ayurveda), E.S.I.C Hospital and O.D.C (E.Z), D.H. Road, P.O: Joka, Kolkata,²Professor and Head, ³Ex-Professor, Department of Kaya Chikitsa, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

Abstract

Obesity is defined as the condition in which excessive amount of fat is accumulated in the body. Classical Ayurvedic texts describe eight types of despicable designated as ‘Nindita purusha’ including atisthaulya. Corpulent people are characterized by short in longevity, slow movement, difficult to indulge in sex, weak, emission of bad body odor, profuse perspiration, excessive hunger and excessive thirst. Sixty to seventy percent of cardiac patients die of obesity and contribute to develop coronary artery disease, diabetes mellitus, hypertension, hyperlipidaemia. In the present study, 66 patients of obesity were treated with Shilajatu processed with Agnimantha. After completion of therapy, 5.09 ± 0.24 kg and 2.06 ± 0.10 kg/m² reduction of body weight and body mass index, respectively were noted. The result was found to be statistically highly significant (P<0.001). No adverse effects were observed in any of the treated patients.

Key words: Asphaltum punjabianum, Clerodendrum phlomidis, Obesity, Shilajatu, Sthaulya

Introduction

An excess accumulation of energy in the form of body fat >25% in males and >30% in females is considered as obesity which is becoming a global health problem.[1] It is the most common nutritional disorder in affluent society. The weight charts for men and women according to their height (BMI) are only rough indications of the state of overweight or obesity. Obesity can be compared with ‘Medoroga’ in Ayurveda[2] and said that, comparatively it is easy to help an underweight person rather than a overweight person. The overweight/obese problem can either be due to an actual increase in fat component or due to malfunctioning. Body is made of seven Dhatus (tissue) but obese are nourished excessively by Meda Dhatu (fatty tissue) and other remaining tissues get malnourished, Kapha gets accumulated in between. When Kapha increases in abnormal fashion, fat metabolism is hampered and persons become obese.[3]

According to latest estimates, the prevalence of overweight and obesity in the United States makes obesity a leading public health problem with highest rates of obesity in the developed world.[4] During 1980 to 2002, obesity has found doubled in adults and overweight being tripled in children and adolescents.[5] Currently, about 119 million or 64.5% of US adults are either overweight or obese and continue to rise in United States. The health service of England predicts that >12 million adults and 1 million children will be obese by 2010, if no action is taken.[6] Obesity, an increased fat content in the body, is now a major health problem in India; even under weight Indians have higher fat content than overweight foreigners. Recent survey shows 60% middle aged, working class Indians in Mumbai were overweight. In another survey, 30% children in Delhi’s elite schools were in the same category.[7] Doctors are also far more obese with 55.5% had high waist circumference against 35.8% in the general population.[8] Overweight also contributes to develop diabetes mellitus, hypertension, hyperlipidaemia, kidney and gall bladder disorder. It has implicated an increased incidence of some types of cancer. Persons with over weight suffer from osteoarthritis menstrual irregularities, bad body odor, become common targets of comments and taunts which can affect psychological health of the person.

Many drugs like appetite suppressants, HMG-co reductase inhibitors, pancreatic lipase inhibitors, S-NRI etc. and bariatric surgery have not been able to control the increasing number of obese in the society. Moreover, modern drugs have limitations in their actions and are not free from side effects. On the other hand, the physicians of Indian System of Medicine are treating this condition for thousands of years with no remarkable side
effects. Ayurvedic treatment of a disease consists of salubrious use of drug, diet and healthy life style. Medicinal preparations are single or complex mixtures, based on plant, animal and mineral products. Many cost-effective Indian medicinal plants have come after scientific scrutiny since the middle of nineteenth century, although in sporadic fashion having no remarkable side effects.\(^9\)

The present study deals with the classical herbo-mineral compound containing *Shilajatu* (*Asphaltum punjabianum*) and *Agnimantha* (*Clerodendrum phlomidis* Linn.) indicated for *Sthaulya*.\(^9\)

**Aims and objectives**
To evaluate therapeutic efficacy and adverse effects of *Shilajatu* processed with *Agnimantha*.

**Materials and Methods**

66 patients of *Sthaulya* were registered from OPD and IPD of I.P.G.T and R.A, hospital, Jamnagar fulfilling the clinical diagnostic criteria of *Sthaulya* based on Ayurvedic and modern parameters. Out of 66 registered patients, 53 patients completed the treatment and remaining 13 patients dropped out at different intervals. Five patients were migrated to another place for job, five patients had poor compliance and were unable for regular check up, one female patient was conceived, and two patients had lack of faith in Ayurvedic medicine.

**Inclusion criteria**
The patients of *Sthaulya* (obesity) were selected after taking short history from the O.P.D and I.P.D of I.P.G.T and R.A, hospital. Patients between the age of 20 to 60 years were selected. The patients selected for clinical trial were according to signs and symptoms of *Sthaulya* described in Ayurvedic texts and modern parameters [BMI kg/m\(^2\): 18.5-24.9 is normal; 25-29.9 over weight, 30-34.9 obesity class-I, 35-39.9 class II] were also considered. Thus cases between BMI>25 kg/m\(^2\) and <40 kg/m\(^2\) were included.

**Subjective criteria**
A proforma incorporating all clinical aspects mentioned for *Sthaulya* was prepared. Detailed medical history and thorough clinical examination was done. The signs and symptoms of *Sthaulya* mentioned in *Ayurveda* were assigned a suitable scoring pattern to assess the condition of the patients before and after the completion of therapy [Table 1].

**Objective criteria**
Assessment of patients by B.M.I (body mass index)=weight (in kg)/height (m\(^2\)), body circumference (cm), skin fold thickness (cm), and laboratory investigations carried out before and after treatment include: a) routine hematological investigations including HB%, TC, TG, ESR, b) routine urine analysis; c) routine stool analysis; d) biochemical examinations like blood sugar (fasting and post prandial), lipid profile (serum cholesterol, serum HDL, serum LDL, triglyceride), blood urea and serum creatinine, serum T\(_3\), T\(_4\), TSH (limited and selected cases to rule out abnormal thyroid function).

**Exclusion criteria**
Patients below the age of 20 years and above the age of 60 years, patients had lack of faith in Ayurvedic medicine.

**Table 1: Scoring pattern of Sthaulya**

| Scoring pattern                           | Grading |
|------------------------------------------|---------|
| **Bharavididdhi (rise of body weight)**  |         |
| BMI - <27 kg/m\(^2\)                     | 0       |
| BMI - 27-29.9 kg/m\(^2\)                 | 1       |
| BMI - 30-32.9 kg/m\(^2\)                 | 2       |
| BMI - 33-35.9 kg/m\(^2\)                 | 3       |
| BMI - >36 kg/m\(^2\)                     | 4       |
| **Angachalatva (pendulous movement of body parts)** |         |
| Absence of Angachalatva                  | 0       |
| Little visible movement after fast       | 1       |
| movement                                 |         |
| Little visible movement after moderate   | 2       |
| movement                                 |         |
| Movement after mild movement             | 3       |
| Movement even after change of posture    | 4       |
| **Gaurava (heaviness of body)**          |         |
| Absence of Gaurava                       | 0       |
| Occasional heaviness                     | 1       |
| Persistent heaviness relieved after rest | 2       |
| Persistent heaviness not relieved after  | 3       |
| rest, can do normal daily work           |         |
| Persistent heaviness cannot do normal    | 4       |
| daily work                               |         |
| **Swedadhikya (excessive perspiration)** |         |
| Sweating after heavy work                | 0       |
| Sweating after little work               | 1       |
| Profuse sweating after heavy work        | 2       |
| Profuse sweating after minimum work      | 3       |
| Sweating even in resting condition       | 4       |
| **Atipipasa (excessive thirst)**         |         |
| Normal thirst                            | 0       |
| Upto 1 l excess intake of water          | 1       |
| 1 to 2 l excess intake of water          | 2       |
| 2 to 3 l excess intake of water          | 3       |
| More than 3 l excess intake of water     | 4       |
| **Gatra Daurgandha (bad body odor)**     |         |
| Absence of bad smell                     | 0       |
| Occasionally bad smell to close areas    | 1       |
| difficult to suppress with deodorants.   |         |
| Persistent bad smell felt from long      | 2       |
| distance and not suppress with           |         |
| deodorants.                              |         |
| Persistent bad smell felt from long      | 3       |
| distance, even intolerance to the patient|         |
| himself.                                 |         |
| **Ati Kshudha (excessive hunger)**       |         |
| Unwilling for food but could take the    | 0       |
| meal.                                    |         |
| Willing toward only most liking food and  | 1       |
| not others.                              |         |
| Willing toward only one among *Katul/Amla/ |         |
| *Lavana/Madhura* food stuffs.            | 2       |
| Willing toward some specific *Ahar/Rasa/  | 3       |
| *Vishesa*                                |         |
| Equal willing toward all the *Bhojiya*   | 4       |
| *Padartha*.                              |         |
| **Kshudra Shvas (dyspnoea on exertion)** |         |
| Dyspnoea after heavy work but relieved   | 0       |
| soon and up to tolerance.                |         |

(Contd...)
endocrine disorders like diabetes mellitus, hypothyroidism, Cushing’s syndrome and obesity with cardiac problems like hypertension, ischemic heart disease, cardiac failure were excluded. Sthauya with pregnancy and with other significant associated illness, patients taking cortico-steroids, oral contraceptive pills and B.M.I-40 kg/m² and above i.e. class –III extremely high obesity and severe complicated cases were also excluded. Written consent for clinical trial was duly taken from each patient and they were free to withdraw any time from study as per their wish, they were told. This study was cleared by the Institutional Ethics Committee.

Method of preparation of the trial drug
Purified Shilajatu was triturated seven times in Swaras (fresh juice) of Agnimantha (Clerodendrum phlomoidis Linn.) and capsules were prepared of 500 mg each. Both the components of the trial drugs were procured from the Pharmacy, Gujarat Ayurved University and duly identified. Agnimantha leaves were washed with clean water and juice was prepared. Bhavana with juice was given for seven times to Shilajatu. For seven Bhavana, total 30 days period was required. After proper drying, it was finely powdered and 500 mg capsules were filled. It was given in a dose of two capsules twice daily for 10 weeks with luke warm water. The medicine was packed in polythene pouch each containing 56 capsules, to fulfill the requirement of two weeks for each patient.

Dose: Two capsules twice daily (each of 500 mg) before meal
Duration: 10 weeks
Anupana: Luke warm water

Follow up
Patients have been examined for follow up for one month at the interval of 15 days to record the effect of therapy.

Statistical analysis
The information gathered on the basis of observation made about various parameters was subjected to statistical analysis in terms of mean values, standard deviation (SD), standard error (SE). Paired ‘t’ test was carried out at $P<0.05$, $<0.01$ and $<0.001$. The obtained results were interpreted as: $P>0.05$ considered as insignificant, $<0.01$ to $<0.05$ considered as significant and $<0.001$ is highly significant and the $P$ values are adapted from java script.[11]

Observations and Results
The demographic data of 66 registered patients of obesity revealed that maximum patients (45.45%) had Kapha-Pittaaja Deha Prakriti followed by 42.42% Kapha-Vataaja Deha Prakriti. The Prakriti of each patient was decided as per the information given in Tables 2 and 3. Maximum (36.36%) patients belonged to age group of 20-30 years followed by 34.85% of 31-40 years and females (80.30%). Religion-wise maximum patients were Hindus (68.18%). Majority of patients were housewives (71.21%), maximum patients were from urban area (90.90%) and from middle-income group (56.06%). Maximum patients (43.93%) had history of sedentary type of work, indulge vegetarian diet (65.15%) and had consumed (45.45%) Sarvarasa (all type of taste includes sweet, sour, salty, pungent, bitter and astringent). Maximum patients had consumed Madhur Rasa (sweet taste) in their daily diet (60.60%).

Discussion
The data shows a statistically highly significant relief was found in Bhavrridhi, Angachalatva, Angagaurava, Swedadhikya, Atipipasa, Gatradauragandha, Akikshudha, Kshudra Shivas, Utsahahani, Atinidra, Snigdhangata, Daurbalya while improvement in Maithuna Hani was statistically insignificant [Table 4]. Disease Sthauya originates due to consumption of Kapha Vriddhikara Ahara (diet), Vihara (regimen) and Manasa (psychological) Nidana (causes). These factors derange Jatharagni (digestive juices, enzymes, hormones) causing Ama (metabolic toxins) production, which results in Medodhatvagni-Mandya (improper production of anabolic enzymes of fatty tissue). This condition leads to excessive growth and accumulation of Medo Dhatu, causing the
Table 2: Main subjective features of various Prakriti[12]

| Features       | Vata Prakriti | Pitta Prakriti | Kapha Prakriti |
|----------------|---------------|----------------|----------------|
| Appetite       | Irregular     | Sharp          | Low            |
| Bowel habit    | Constipated   | Unformed faces | Regular and well formed faces |
| Temper         | Very easily   | Excited, may become violent | Slowly excited but does not give up revenge once excited |
| Reactive power | Very quick    | Quick          | Slow but steady |
| Sexual desire  | Meager        | Moderate       | Abundant       |
| Types of dreams| Flying in sky, jumping, running, climbing trees | Blazing fire, lightening, golden sun, struggle, wars | Water, lakes, river, birds, swan, cloud, ocean, romance |
| Desire for     | Warm article  | Cold article   | Warm article   |

Table 3: Main objective features of various Prakriti[12]

| Features       | Vata Prakriti | Pitta Prakriti | Kapha Prakriti |
|----------------|---------------|----------------|----------------|
| Body frame     | Long or short but lean | Medium size | Large, plump, fleshy and fatty |
| Skin           | Blackish, rough, cracking | Fair, reddish with moles, freckles | Fair and whitish, soft and smooth |
| Body weight    | Less or lower side of normal range | Average | Excessive, tendency for obesity |
| Hairs          | Scanty and rough | Scanty, soft, dry, tough, tendency for premature graying, falling and baldness | Plenty, smooth, soft, black, thick, long with firm roots |
| Face           | Nonspecific   | Delicate with wrinkles | Attractive, glossy |
| Body color     | Blackish      | Coppery         | Fair, whitish, unctuous, glossy |
| Lips           | Dry and blackish | Coppery         | Uncntuous and moist |
| Tongue         | Darkish       | Coppery         | Clean |
| Activity       | Quick, light and active and frequently moves body parts | Moderately active body parts | Slow |
| Sleep          | Scanty and interrupted | Moderate and sound | Deep and excessive |

The reduction was observed in PPBS (1.66%), serum cholesterol (3.31%), serum LDL (4.76%) and serum triglyceride (6.56%). The serum cholesterol decrease was quite significant (P<0.05) whereas reduction in PPBS, serum LDL and serum triglyceride was insignificant (P>0.05). The increase in serum HDL-cholesterol was observed 1.85%, though statistically insignificant (P>0.05) [Table 8]. The above data reveals that the drug has not shown encouraging results in respect to various biochemical parameters except serum cholesterol.

Shilajatu has proven to possess liver protecting effects and lowers cholesterol and triglyceride levels. It helps in reducing accumulation of fatty substances and cholesterol in the arteries and prevents LDL cholesterol from reacting with free radicals and hence preventing their accumulation in the arteries.[18] 7.72% reduction of body fat was observed which was statistically highly significant by conventional criteria in two tailed paired ‘t’ test (P<0.001), while increased level of BMR was 7.62%, which was statistically highly significant (P<0.001) in paired ‘t’ test. Shilajatu has been used as a strong aphrodisiac for men since ancient times in India. It counteracts free radicals and arrests degenerative disorders and maintains the equilibrium of energy metabolism in the body.[19] When total effect of the treatment on subjective and objective parameter was taken into consideration, it was revealed that marked improvement was observed in 9.43% cases, moderate improvement in 56.61%, mild improvement in 26.42% cases whereas 7.54% cases remained unchanged.

Conclusion

Agnimantha processed with Shilajatu is found to be a potent. Moreover, from pharmacovigilance point of view, no clinical adverse effects have had been observed in any of the patients during the study.
Table 4: Response of treatment on subjective criteria

| Clinical features          | n   | Mean score | % of relief | SD  | SE  | t    | P     |
|----------------------------|-----|------------|-------------|-----|-----|------|-------|
|                            | BT  | AT         |             |     |     |      |       |
| Bhav Vriddhi               | 53  | 2.43       | 1.92        | 20.93 | 0.50 | 0.07 | 7.35  | <0.001|
| Angachalatva               | 20  | 2.1        | 1.1         | 47.62 | 0.65 | 0.14 | 6.89  | <0.001|
| Angagaurava                | 28  | 1.75       | 0.07        | 95.92 | 0.47 | 0.09 | 18.68 | <0.001|
| Swadadhikya                | 36  | 1.80       | 0.28        | 84.62 | 0.74 | 0.12 | 12.45 | <0.001|
| Atip Pipasa                | 31  | 2.29       | 0.42        | 81.69 | 0.76 | 0.75 | 2.51  | <0.001|
| Gatradaurgandhya           | 14  | 1.28       | 0.36        | 72.22 | 0.62 | 0.16 | 5.64  | <0.001|
| Atikshudha                 | 21  | 3.04       | 0.81        | 73.44 | 1.09 | 0.24 | 9.40  | <0.001|
| Kshudrashvasa              | 38  | 2.07       | 0.63        | 69.62 | 0.55 | 0.09 | 16.08 | <0.001|
| Utsahahani                 | 10  | 1.1        | 0.2         | 81.69 | 0.32 | 0.1  | 9.00  | <0.001|
| Maithunahani               | 5   | 2.6        | 0.2         | 92.31 | 1.14 | 0.26 | 9.39  | <0.001|
| Snigdhangata               | 11  | 1.45       | 0.18        | 87.50 | 0.47 | 0.14 | 9.00  | <0.001|
| Daurbalya                  | 33  | 1.88       | 0.12        | 93.55 | 0.43 | 0.26 | 9.39  | <0.001|

BT - Before treatment, AT - After treatment, SD - Standard deviation, SE - Standard error

Table 5: Response of treatment on weight and BMI

| Parameters                  | n   | Mean weight and BMI | % of relief | SD  | SE  | t    | P     |
|-----------------------------|-----|---------------------|-------------|-----|-----|------|-------|
|                            | BT  | AT                  |             |     |     |      |       |
| Weight (kg)                 | 53  | 82.34               | 77.25       | 6.19 | 1.82 | 0.25 | 20.42 | <0.001|
| BMI (kg/m²)                 | 53  | 33.30               | 31.24       | 6.19 | 0.73 | 0.10 | 20.47 | <0.001|

Table 6: Response of treatment on organ measurement

| Organ          | n   | Mean measurement (cm) | % of relief | SD  | SE  | t    | P     |
|----------------|-----|-----------------------|-------------|-----|-----|------|-------|
|                | BT  | AT                    |             |     |     |      |       |
| Chest          | 53  | 104.19                | 100.96      | 3.09 | 1.90 | 0.26 | 12.36 | <0.001|
| Abdomen        | 53  | 101.61                | 97.18       | 4.36 | 2.15 | 0.29 | 15.04 | <0.001|
| Buttocks       | 53  | 116.18                | 112.80      | 2.91 | 3.12 | 0.43 | 7.87  | <0.001|
| Thigh          | 53  | 55.29                 | 52.96       | 4.21 | 1.85 | 0.25 | 9.18  | <0.001|
| Shank          | 53  | 38.83                 | 37.76       | 2.75 | 1.06 | 0.15 | 7.32  | <0.001|
| Arm            | 53  | 33.61                 | 31.45       | 6.43 | 1.03 | 0.14 | 15.31 | <0.001|

Table 7: Response of treatment on skin folds thickness

| Skin fold at     | n   | Mean measurement (cm) | % of relief | SD  | SE  | T    | P     |
|------------------|-----|-----------------------|-------------|-----|-----|------|-------|
|                  | BT  | AT                    |             |     |     |      |       |
| Biceps           | 53  | 2.40                  | 2.14        | 11.01 | 0.14 | 0.01 | 14.14 | <0.001|
| Triceps          | 53  | 2.97                  | 2.64        | 10.99 | 0.20 | 0.02 | 11.87 | <0.001|
| Scapular         | 53  | 2.98                  | 2.69        | 9.69  | 0.17 | 0.02 | 12.32 | <0.001|
| Abdomen          | 53  | 3.19                  | 2.83        | 11.23 | 0.17 | 0.02 | 15.42 | <0.001|
| Thigh            | 53  | 3.08                  | 2.81        | 8.88  | 0.16 | 0.02 | 12.47 | <0.001|

Table 8: Effect on biochemical parameters

| Parameter (mg%)  | n   | Mean values (mg/dl) | % of relief | SD  | SE  | t    | P     |
|------------------|-----|---------------------|-------------|-----|-----|------|-------|
|                  | BT  | AT                  |             |     |     |      |       |
| PPBS             | 44  | 107.70              | 105.91      | 1.67 | 17.51 | 2.64 | 0.68  | >0.05 |
| Serum cholesterol| 53  | 179.62              | 173.68      | 3.31 | 24.65 | 3.39 | 1.76  | <0.05 |
| Serum HDL        | 53  | 44.15               | 44.96       | 1.84 | 10.41 | 1.43 | 0.57  | <0.05 |
| Serum LDL        | 53  | 111.61              | 106.29      | 4.76 | 25.28 | 3.47 | 1.53  | >0.05 |
References

1. National institute for health and clinical excellence. Clinical guideline 43: Obesity: The prevention, identification, assessment and management of overweight and obesity in adults and children. London: 2006, available on http://www.websters-online-dictionary.org/definitions/obesity [Last accessed on 2009].

2. Madhava Nidana with Madhukosha and Vidhyotini Tika edited by Prof. Yudunandan Upadhya. Chapter-34/1-4. 27th ed. Varansi: Chaukhamba Sanskrit Sanstan; 1997.

3. Ayurveda for you ayurveda for over weight-obesity. Available from: http://ayurveda-for-you.com/treat/overweight.html. [Last accessed on 2008 aug 04].

4. Health at a glance. OECD Indicators. Available from: http://www. healthinsite.gov.au/news/Health_at_a_Glance_2007___OECD_Indicators [Last accessed on 2007].

5. Ogdend CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of Overweight and Obesity in the United States, 1999–2004, JAMA 2006; 295:1549-55.

6. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of Overweight and Obesity in the United States, 1999–2004, JAMA 2006; 295:1549-55.

7. Body Basics, Fat no more, inputs from Dr. Ramen Goel, President, All India association for advancing research in obesity. Ahmedabad: The Times of India; 2008.

8. Kounteya S. Doctors in India are an ailing lot, study: More medicos suffer from high BP, obesity than masses. Jan 12. Ahmedabad: The Times of India; 2008.

9. Pattonder RK, Tripathy PC. A clinical study of sarpagandha and maricha yoga in the management of hypertension, MD(Ay) thesis, C.U, 2006.

10. Agnivesha. ‘Charak Samhita’ revised by Charak and Dridh bala with ‘Ayurveda Dipika’ commented by Chakrapani datta, edited by Vaidya Jadvaji Trikamji Acharya. Varanasi, India: Chaukhambha Surbharti Prakashan; 2005.

11. Available from: http://www.oswego.deu/~kane/econometrics/calculators.html [Last accessed on 2010 Jun 10].

12. Singh Gurdip. Ayurveda a complete guide. Berlin, Germany: Published by DAM; 2003.

13. Anti aging supplement, Morpheme remedies. Available from: http://www.morphemeremdes.com/shilajit.htm [Last accessed on 2010 Jun 12].

14. Indian Medicinal Plants Growers’ consortium. Available from: http://www.impgc.com/plantinfo_A.php?id=236 [Last access on 2010 Jun 12].

15. Mother herbs and agro products. “Asphaltum Punjabianum Extract” Available from: http://www.motherherbs.com/asphaltum-extract.html [Last accessed on 2010].

16. Mother herbs and agro products. “Asphaltum Punja gianum Extract” Available from: http://www.motherherbs.com/asphaltum-extract.html [Last accessed on 2010].

17. Health checks system. Available from: http://www.healthchecksystems.com/bodyfat.htm [Last accessed on 2010 Jul 6].

18. Shilajit. Herbal Ayurvedic Remedies. Com. Available from: http://www.herbalayurvedicremedies.com/product_desc.asp?descid=127 [Last accessed on 2010 Jun 6].

19. Ayurveda herbs. Herbal Supplement Shilajit Anti Aging Regulate Metabolism. Available from: http://www.ayurvedaherbs.com/html_pages/item_list.htm. [Last accessed on 2010 Jun 6].