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## **The Black Market of Anabolic Agents**

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### *Introduction*

Most positive cases in dope control result from the prohibited class of anabolic agents (1). Outside sports many studies have shown that anabolic agents, especially anabolic androgenic steroids (AAS), are misused from fitness club members, students and also young children (2, 3). The users receive the anabolic agents from the black market. The information about the sources, prices, effects, side effects and recommended doses are delivered via internet, sports magazines and special books. According to estimations of the American Food and Drug administration (FDA) the volume of the black market for AAS has increased from 100 millions Dollar in 1980 to 500 millions Dollar in 1992 (4).

### *Recommended doses of anabolic agents*

In the above mentioned information sources it is recommended to take anabolic agents in „cycles“, which are episodes of use lasting several weeks (2-3 cycles a year) with pauses between the cycles. During the cycles different kind of anabolic agents should be taken at the same time (stacking). To avoid developing a tolerance to a particular anabolic agent, it is recommended to „stagger“ the drugs, i.e. taking the drugs in an overlapping pattern or stop a drug and start another. In table 1 an example of such a recommended steroid cycle is presented (5). The amount of AAS increases within the first 3 weeks to 314 mg/day and then decreases (fig. 1). The average duration of such a cycle is 12 weeks with a consumption of AAS between 2500 and 30000 mg (tab. 3). To fight against the side effects of the AAS and to keep the anabolic effects after the cessation of the AAS, it is recommended to take additionally antiestrogenic substances,  $\beta$ 2-agonists and substances, which stimulate the testosterone synthesis (tab. 1 and 4). In table 2 is shown a steroid cycle for athletes, who take part at a competition with dope control. Here are given recommendations, when to stop the AAS application before the dope control, to prevent the detection of their misuse.

### *Most frequently recommended anabolic agents*

The most frequently recommended anabolic agents (from 22 stacking cycles of 1995-1996 ( 5, 6 ) ) in the „black market literature“ are presented in table 5. The most frequently recommended AAS testosterone, metandienone, nandrolone and stanozolol correspond to the most frequently reported substances in the annual statistics of the IOC accredited dope control laboratories. It is interesting, that the  $\beta$ 2-agonist clenbuterol is recommended in nearly all cycles and that no other  $\beta$ 2-agonist is recommended.

### *Sources and costs of anabolic agents from the black market*

The main sources of the European black market of anabolic agents are Estland, Poland, Russia, Hungary, Greece, Spain, Thailand, Pakistan, Canada, USA and Mexico (5). In many of these countries, anabolic agents, sold illegally via pharmacies, are much cheaper as e.g in Germany (tab. 6). In Thailand 5 mg of metandienone can be bought in pharmacies for about 0,11 DM. The black market price of a 5 mg tablet in Europe is about 0,44 DM (5). According to black market informations, the illegal acquisition of anabolic agents, i.e. without prescription, is very easy in most of these countries (tab. 7).

In table 8 are calculated the costs for the steroid cycle presented in table 1 according to the black market prices of 1996 (5, 6). The 681 tablets and 33 injection ampoules of this 12 weeks cycle cost in European black market 1600 DM and on the US market about 2400 DM.

### *Fakes of AAS from the black market*

The „black market literature“ contains a lot of warnings for fakes of AAS. The analyses of 64 black market AAS resulted in 27 fakes (tab. 9). The faked AAS contained either another AAS or no AAS. The product labels couldn't be differentiated from the originals.

### *Analyses of urine samples from bodybuilders*

The results of analyses of urine samples from bodybuilders, who declared to have taken AAS within the last 3 months are presented in table 10. These results show, that bodybuilders follow the recommendations of the black market information sources. There are many differences

between the declared and detected AAS. These differences are explainable by wrong declarations, by the administration of fakes or by the application of longterm detectable substances in former steroid cycles.

### *Conclusion*

The black market for anabolic agents has not yet the public attention as e.g the black market for narcotic drugs, although more and more young people come in touch with this market. The health risks of the uncontrolled application of anabolic agents, the application of fakes and the polypharmacy may lead to big problems for the whole society. To fight against the expansion of the black market, it is necessary to perform studies about the misuse of anabolic agents in and outside sports, to inform the society, especially young people, about side effects of anabolic agents and to establish laws, which allow the punishment of the trafficking and the possession of anabolic agents.

### References

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Tab. 1: Example of a recommended steroid cycle. European Anabolic Update 1, Example 3 1996 (5).

Week	Anapolon (Oxy- metholone)	Sustanon (4 Testosterone- esters)	Deca (Nandrolone- decanoate)	Dianabol (Metandienone)	HCG
1	50 mg/d	250 mg/w	400 mg/w		
2	100 mg/d	500 mg/w	400 mg/w		
3	150 mg/d	750 mg/w	400 mg/w		
4	100 mg/d	750 mg/w	400 mg/w		
5		750 mg/w	200 mg/w	50 mg/d	5000 IU/w
6		500 mg/w	200 mg/w	45 mg/d	5000 IU/w
7		250 mg/w	200 mg/w	40 mg/d	
8		250 mg/w	100 mg/w	30 mg/d	
9				20 mg/d	
10				10 mg/d	5000 IU/w
11					5000 IU/w
12					5000 IU/w

Additionally:

Nolvadex (Tamoxifene citrate) 20-40 mg/d from week 1-16

Clomid (Clomiphene citrate) 100 mg/d in week 12, 50 mg/d in week 13 and 14

Clenbuterol 80 µg/d (2 days then 1 day off) from week 12-17

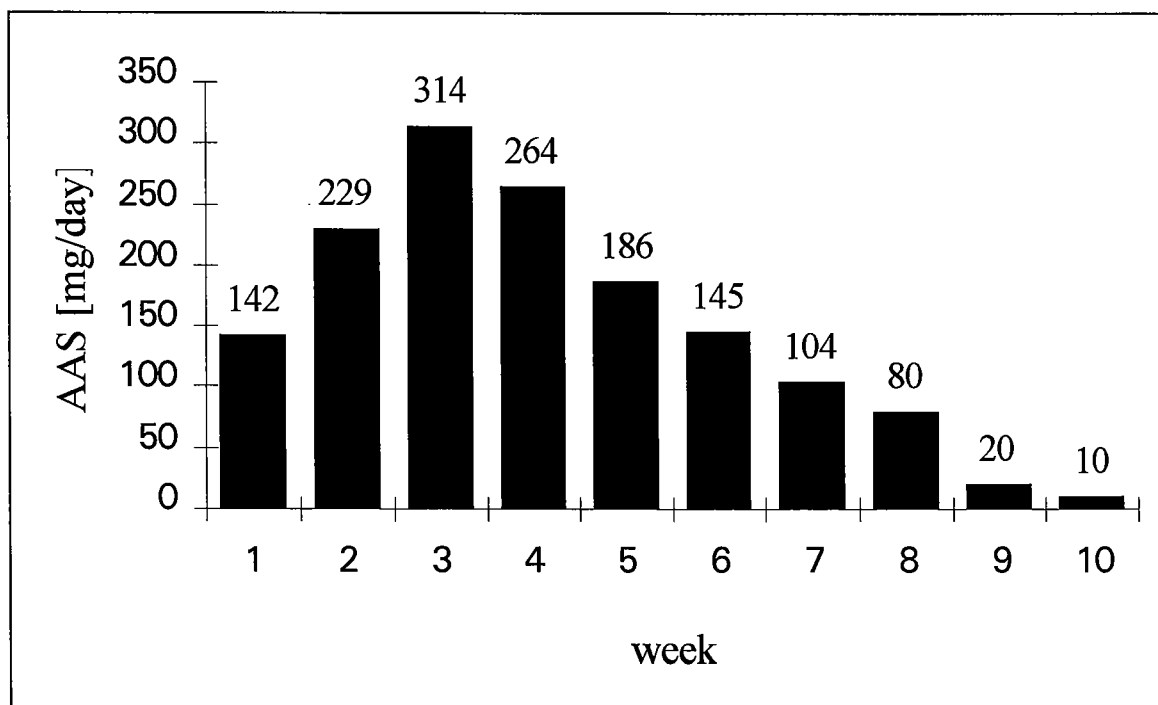


Fig. 1: Example for recommended amounts of AAS in mg/day. ( European Anabolic Update 1, 1996 Example 3)

Tab. 2: Recommended stacking with AAS before dope controls (MuscleMag January 1991, recommendation for women)

weeks before dope control	Winstrol (Stanozolol) tablets/day	Primobolan (Metenolonacetat) tablets/day	Maxibolan (Ethylestrenol) tablets/day
15	2	2	2
14	2	2	2
13	3	2	3
12	3	2	3
11	3	2	3
10	2	2	2
9	2	2	2
8	2	2	2
7	2	1	2
6	2	1	1
5	1	1	1
4		1	1
3		1	
2		1	
1			

Tab. 3: Evaluation of 22 AAS stacking cycles recommended in the „black market literature“ (5, 6). m: mean, ± s: standard deviation

cycle	weeks of AAS application	total amount of AAS [mg]
1	15	9155
2	10	7175
3	12	10465
4	10	5140
5	15	12050
6	12	8700
7	13	13015
8	10	5915
9	11	33611
10	8	19660
11	12	10128
12	10	17390
13	16	5160
14	13	6855
15	13	5883
16	10	7843
17	17	9452
18	12	20320
19	16	2660
20	11	9689
21	12	7320
22	12	3510

**m ± s**

**12.2 ± 2.3**

**10504 ± 7000**

Tab. 4: Substances which are taken during and after a longterm application of AAS to fight against their side effects.

substance	effect
HCG	stimulation of testosterone synthesis
Tamoxifen-Citrat (Nolvadex)	antiestrogen
Clomiphen-Citrat (Clomid)	stimulation of testosterone synthesis, Antiestrogen
Clenbuterol	increase of lipolysis, increase of muscle mass
Aminoglutethimid (Cytadren)	antiestrogen; anticatabolic effect
Cycofenil (Fertodur)	stimulation of testosterone synthesis, antiestrogen

Tab. 5: Most frequently recommended anabolic agents. Analysis of 22 stacking cycles (5, 6)

substance	number of cycles
Clenbuterol	19
Testosterone ester	16
Metandienone	14
Nandrolone decanoate	13
Stanozolol	9
Metenolone ester	9
Oxymetholone	7
Trenbolone hexahydrobenzylcarbonate	7
Oxandrolone	6
Drostanolone propionate	2
Boldenone undecylenate	1
Dihydrotestosterone	1
Mesterolone	1
Dehydrochloromethyltestosterone	1

Tab. 6: Prices for AAS in DM (1996) in pharmacies in Europe and on the black market (GR: Greece, HU: Hungary, SP: Spain, PL: Poland, UK: United Kingdom)

	Germany	Europe	Black Market	
			UK	USA
Nandrolon-decanoat 50 mg	29,63	5,90 (SP)	5,90	13,27
Testosteron-undecanoat 40 mg	92,15		95,80	119,20
Testosteron-propionat 100 mg	7,28	4,43 (SP,GR)	10,33	12,39
Metenolon-enantat 100 mg	17,60	8,85 (SP,GR) 5,10 (PL)	17,70	23,90
Mesterolon 50 x 25 mg	55,45	15,93 (SP)		
Tamoxifen-citrat 30 x 20 mg	95,78	29,50 (SP) 44,25 (GR)	73,75	79,65
Clenbuterol 30 x 20 µg	16,59	11,80 (SP) 5,90 (PL,HU)	35,40	53,10



Tab. 7: Information about availability of AAS from European Anabolic Update 2, 1996 (5).

### Legal aspects and availability of AAS

<b>UK</b>	illegal to sell / distribute legal to use / possess / import <b>Not available via pharmacies</b>
<b>Sweden</b>	illegal to possess / use / import / distribute <b>Not available via pharmacies</b>
<b>Turkey</b>	legal to possess / use <b>Available via pharmacies</b>
<b>Greece</b>	legal to use / possess <b>(Supposedly) Not available via pharmacies</b>
<b>Spain</b>	legal to use / possess / import <b>Available via pharmacies. The best is Malaga - full list of pharmacies and a street map with the pharmacies pinpointed coming up in the next issue !!</b>

Tab. 8: Costs of a recommended steroid cycle of 12 weeks with 681 tablets and 33 injection ampoules (European Anabolic Update 1, 1996 Example 3)

Substance	Application	Black Market prices	
		UK	US
Oxymetholone	56 tabl. à 50 mg	99,12 DM	89,21 DM
4 Testosterone esters	16 amp. à 250 mg	283,20 DM	339,84 DM
Nandrolone dec.	12 amp. à 200 mg	271,40 DM	610,65 DM
Metandienone	273 tabl. à 5 mg	120,80 DM	241,61 DM
HCG	5 amp. à 5000 IU	88,50 DM	132,75 DM
Clenbuterol	100 tabl. à 20 µg	118,00 DM	177,00 DM
Tamoxifene-Citrate	224 tabl. à 20 mg	550,67 DM	594,72 DM
Clomiphene Citrate	28 tabl. à 50 mg	68,83 DM	172,67 DM
		<b><u>1600,52 DM</u></b>	<b><u>2358,44 DM</u></b>

Tab. 9: Fakes on the black market: Analyses of 64 AAS from the black market resulted in 27 fakes.

Trade name	expected substance	detected substance
Anapolon 50 (Syntex)	Oxymetholone	Metandienone <sup>1, 2</sup>
CYCTAHOH 250	3 Testosteronester	Nandrolone decanoate <sup>2</sup>
Heptylate de Testosterone (Theramex)	Testosteronester	Nandrolone decanoate <sup>2</sup>
Masteron (Syntex)	Drostanolone propionate	Methandriol dipropionate <sup>2</sup>
Masteron (Syntex)	Drostanolone propionate	Nandrolone decanoate <sup>1, 2</sup>
Oxandrolone (Spa)	Oxandrolone	Stanozolol <sup>1</sup>
Oxitosona (Syntex Latino)	Oxymetholone	Metandienone, Methyltestosterone <sup>1</sup>
Parabolan (Negma)	Trenbolone hexahydrobenzylcarbonate	4 Testosteronester <sup>2</sup>
Parabolan (Negma)	Trenbolon hexahydrobenzylcarbonat	Nandrolone decanoate <sup>1, 2, 3</sup>
Parabolan (Negma)	Trenbolone hexahydrobenzylcarbonat	Methyltestosterone <sup>2</sup>
Parabolan (Negma)	Trenbolon hexahydrobenzylcarbonat	no steroids <sup>2</sup>
Primobolan depot (Schering)	Metenolone enanthate	Tocopherol <sup>2</sup>
Primobolan depot (Schering)	Metenolone enanthate	Progesterone <sup>2</sup>
Primobolan depot (Schering)	Metenolon enanthat	Nandrolon phenylpropionate <sup>1, 2</sup>
Primobolan depot (Schering)	Metenolon enanthat	Nandrolone decanoate <sup>1</sup>
Primobolan depot (Schering)	Metenolone enanthate	no steroids <sup>1</sup>
Stromba (Winthrop)	Stanozolol	no steroids <sup>1</sup>
Synasteron 50 (Syntex)	Oxymetholon	Metandienon <sup>2</sup>
Testex Leo 250 (Prolongatum)	Testosteron cypionat	no steroids <sup>1</sup>
Testoviron Depot-250 (Schering)	2 Testosteronester	Nandrolone decanoate <sup>1, 2</sup>

<sup>1</sup> Institute of Biochemistry, German Sports University, Cologne 1997, 1998

<sup>2</sup> Institute of Forensic Medicine, Heinrich-Heine-University, Düsseldorf 1996

<sup>3</sup> Arzneimitteluntersuchungsstelle des Landesinstituts für den Öffentlichen Gesundheitsdienst, Münster 1997

Tab. 10: Analyses of urines from bodybuilders, who declared the misuse of AAS. The underlined AAS were found additionally to the declared AAS.

Clos: Clostebol, DHCL: Dehydrochlormethyltestosterone, Dros: Drostanolone, Meta: Metandienone, Mest: Mesterolone, Mete: Metenolone, Meth: Methyltestosterone, Nand: Nandrolon, Oxan: Oxandrolone, Stan: Stanozolol  
 Test: Testosteron

BB	declared	detected
1	Test, Mete	Test, Mete, <u>Nand</u>
2	Nand, Mete, Stan, Meta, Test	Nand, Mete
3	Test, Stan, Meta, Mete	Test, Stan, Meta, <u>Nand</u>
4	Mete, Stan	Mete, Stan, <u>Nand, Oxan, Meta</u>
5	Nand, Stan, Meta, Oxan	Nand, Meta
6	Mete, Stan, Meta, Test	Mete, Stan, <u>Nand, Mest, Clos, Meth</u>
7	Meta, Oxym	<u>Nand</u>
8	Stan	
9	Nand	
10	Clos	Clos
11	Nand	
12	Stan	Stan
13	Test, Meta, Mete	Nand
14	Stan, Nand, Meta	Stan, Nand, <u>Dros, Test, DHCL</u>